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ABSTRACT

The purpose of this manual is to give teachers the information they need to use student team learning, which is described as a method to promote major academic and nonacademic goals such as improved basic skills, improved student self-concept, and better interpersonal/cross-racial relationships. Complete directions are given for three techniques: (1) Teams-Games-Tournaments (TGT) uses face to face competition on academic games to teach basic skills materials with one right answer; (2) Student Teams-Achievement Divisions (STAD) uses quizzes and also focuses on objective-answer type materials; and (3) Jigsaw uses more structured peer tutoring than TGT and STAD and is most appropriate for literature, social studies, and the concept learning aspects of science. Jigsaw also provides extensive practice in reading for meaning in whatever subject is used. Two forms of Jigsaw are presented, one requiring far less teacher preparation time than the other. Also given are directions for Rutabaga, which is TGT adapted to oral reading in elementary schools. In addition, the manual includes instructions for combining TGT and STAD and directions for a full-day cooperative model that uses all of the techniques. Appendices include scoring data and sheets, instructions for making curriculum materials, and sample materials. (CMG)

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USING STUDENT TEAM LEARNING

The Johns Hopkins Team Learning Project

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UD023261

PREFACE

This manual is the latest product of a program of research that dates back to 1970. Many, many individuals were involved in creating and evaluating the team techniques presented here. David DeVries and Keith Edwards developed Teams-Games-Tournaments based on earlier work by Layman Allen, James Coleman, and others. Gail Fennessey wrote the first TGT manual, of which this one is a direct descendant. Elliot Aronson is the originator of Jigsaw, and has been most helpful in facilitating our inclusion of Jigsaw in this manual. Others who have participated in the research and development of Student Team techniques over the years are listed below:

Ida Mescon
John Hollifield
James McPartland
Susan Shackman
Burma Hulten
John Snyder
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Beverly German
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Joel Carrington
Carolan Smith
Mary Waters
Richard Leach
Stephen Checkon

. . . and the many teachers, students, and others who participated in the research and development of Student Team Learning.

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INTRODUCTION

Do you remember being on a softball team, up at bat, with your teammates behind you shouting, "Hit it a mile!"? You knew you would do your best because your peers, the people who meant the most to you besides your family, depended on you. The thrill of coming through for the team, of being the "star" even for a day, is one that few people forget. Being on a team, working for a cooperative goal, can be one of the most exciting experiences in life.

Can this peer support for achievement, the easy acceptance of teammates, and the excitement of teamwork be transferred to the classroom? Such authors as James Coleman in *The Adolescent Society* and Urie Brofenbrenner in *Two Worlds of Childhood* have suggested that teams could work in the classroom, and a long tradition of research in social psychology has shown that people working for a cooperative goal come to encourage one another to do their best, to help each other do well, and to like and respect one another (1). What remains is an engineering task: How can team learning be made practical and effective in the classroom?

This question touched off six years of research and development in classrooms, carried out primarily by three independent groups of researchers: Elliot Aronson, now at the University of California at Santa Cruz; David Johnson, at the University of Minnesota; and David DeVries, Keith Edwards, and Robert Slavin, at The Johns Hopkins University.

The result of this research and development may be one answer to a major contemporary dilemma of schools: techniques that achieve the humanistic goals that were the focus of education in the 1960's as well as the basic skills learning goals that are now being emphasized.

When we place students on learning teams, each student knows that a group of peers supports his or her academic efforts. This is true because no student can be successful unless his or her teammates do their best. Think back to the softball game. If you got that hit, your teammates went wild with approval; if you didn't, they consoled you and began encouraging the next batter. Can you remember anything like that happening in class? If you can, it was probably in a team spelling bee or other team activity in which your academic efforts could help a group to be successful.

Team Techniques

Our research has demonstrated that teams can be successfully transplanted from the playing field to the classroom. Three team learning techniques have now been extensively researched and found to significantly increase student learning. These are Elliot Aronson's Jigsaw Method, David DeVries' Teams-Games-Tournaments, and Robert Slavin's Student Teams-Achievement Divisions.

Jigsaw. The Jigsaw Method was first investigated as a way to increase students' liking of others in integrated classes, but later research found it to have positive effects in other areas as well. In the Jigsaw, students are assigned to six-member teams. Academic material is broken down into as many parts as there are students on each team. For example, a biography might be broken into early life, first accomplishments, major setbacks, and so on. Members of the different teams who have the same section form "expert groups" and study together. Each then returns to his or her team and teaches the section to the team. Often, the students take a quiz on the entire set of material. The only way students can do well on this quiz is to pay close attention to their teammates' sections, so students are motivated to support and show interest in each others' work. In Jigsaw II, a modification of the Jigsaw method, each student reads all of the material, but focuses on a particular topic. Students discuss their topics in the "expert groups," and then teach them to their teams.

Teams-Games-Tournaments. Teams-Games-Tournaments (TGT) is the best researched of the classroom techniques that use teams. In TGT, students are assigned to four- or five-member learning teams. Each week, the teacher introduces new material in a lecture or discussion. The teams then study worksheets on the material together, and at the end of the week, team members compete in "tournaments" with members of other teams to add points to their team scores. In the tournaments, students compete on skill-exercise games with others who are comparable in past academic performance. This equal competition makes it possible for every student to have a good chance of contributing a maximum number of points to his or her team. A weekly newsletter, prepared by the teacher, recognizes successful teams and students who have contributed outstandingly to their team scores. The excitement and motivation generated by TGT is enormous. Teachers using this method have reported that students who were never particularly interested in school were coming in after class to get materials to take home to study, asking for special help, and becoming active in class discussions. In one project in a Baltimore junior high school that contains a large number of students bused from the inner city, almost every student in two classes stayed after school (and missed their buses) to attend a tie-breaker playoff in the TGT tournament competition.

Student Teams-Achievement Divisions. Student Teams-Achievement Divisions (STAD) is a simple team technique in which students work in four- or five-member teams, and then take individual quizzes to make points for their team. Each student's score is compared to that of other students of similar past performance, so that in STAD, as in TGT, students of all ability levels have a good chance of earning maximum points for their teams. Thus, STAD is like TGT, except

that it substitutes individual quizzes for the TGT game tournament.

A Day in the Life of Jim Jones

To illustrate what goes on in team classes, let's follow a hypothetical student through a day as he experiences three team techniques — Jigsaw, TGT, and STAD. We have chosen to follow a junior high school student, but the basic experience would be the same for an elementary student.

Jim Jones is an average seventh grader; active, inquisitive, and irreverent. He attends Hooperville Junior High. Jim's first class is social studies, where his teacher, Mr. Thomas, is using Jigsaw to teach a unit on Alexander Hamilton. He gets to class a little late, and Mr. Thomas is already handing out expert sheets and social studies books. The expert sheet contains four topics related to a biography of Alexander Hamilton. Jim joins his team and receives his expert sheet, and Mr. Thomas assigns him topic number 4, which is "What were Hamilton's political beliefs?" Everyone reads the biography for about a half hour. Then Mr. Thomas asks the class to be quiet. "Now," he says, "you may all get into your expert groups. Each team member who has Hamilton's early life may sit over here." Mr. Thomas points out places for each expert group to meet, and the students with the same topics get together. Cynthia, from one of the other teams, starts the discussion: "The main thing I got from the chapter is that Hamilton was always disagreeing with Jefferson and Aaron Burr." Jim says, "Yes, but that's not the main point. I think we should concentrate on whether Hamilton was really a royalist or not." The group talks for about ten minutes, sharing their ideas about what they have read and what are the important things about it. At the end of ten minutes, Mr. Thomas asks everyone to return to their teams.

Jim sits with his teammates. Soo Mi, a Korean student who studied about Hamilton's early life, begins to teach her section first. She has problems because of her poor English, but her teammates encourage her to keep going because they need to understand what she has to say. She tells how Hamilton was born in Nevis, in the Caribbean. Sam asks where the Caribbean is, and Yolanda tells him. Then Soo Mi continues to explain how Hamilton came to America, his first job, his role in the American Revolution, and other details. Tyrone tells how Hamilton was involved in the ratification of the Constitution. Next, Yolanda tells the group about the Federalist Papers, and other writings by Hamilton. Finally, it's Jim's turn, and he describes Hamilton's political positions. During this time, Mr. Thomas is moving from group to group, answering questions, clearing up disagreements, and focusing individual students on important points. Finally, Mr. Thomas has everyone put away their books, and he hands out a quiz on the life of Alexander Hamilton. Jim does well on everything except one of the questions about Hamilton and the ratification of the Constitution, and reminds himself to ask Tyrone more questions the next time they do a Jigsaw unit. The bell rings, and Jim is off to his next class, English.

Jim's English class is using STAD, and today is worksheet day. Yesterday, Mrs. Cooper had introduced the idea of commas in a series to the whole class. Today the teams will study worksheets about the use of commas to prepare for tomorrow's quiz.

Jim's team is called "Cooper's Raiders." As the class begins, the Raiders assemble around a table to study their worksheets. Jim pairs off with Alex and quizzes him on the material. The first item is "My dog buried a bone a boot and an apple in the back yard." Alex says, "That's easy. The commas go after 'bone' and 'apple.' " Jim disagrees, and they check the answer sheet. Sure enough, Jim is right. He explains to Alex that commas go after each item in a series except the last item. Alex complains that last year he had been taught that a comma isn't needed after the item in a series that comes before the "and." Jim and Alex call Mrs. Cooper over to explain, and she agrees with Jim that commas go after all items in a series except the last, but also tells Alex that many people do disagree with this rule. She thanks the students for doing such a good job helping each other.

After Jim has quizzed Alex on most of the items, Alex quizzes Jim. When both students feel confident about their abilities to put commas in series, they check to see how their other teammates, Cynthia and Diane, are doing. Everyone on the Raiders wants to get a good score on the quiz. The Raiders finished last in the first week's team competition, fourth in last week's, and now they hope to break into the top three, to have their team especially mentioned in the class newsletter. By the end of the period, all four teammates feel confident and are looking forward to the quiz the next day.

After gym and lunch, Jim goes to math class. This class is using TGT, and today is tournament day — the high point of the week. Jim's team, the "Euclid Kids," have been studying hard all week because they want to keep their first-place position in the TGT competition. In fact, Jim and one of his teammates had come in after school yesterday to ask for material to study at home! Because his grades in math had always been poor, Jim had started the TGT competition at Table 8, one of the lower tables, competing with others who had had poor grades in math. However, Jim had been the highest scorer in his tournaments, and had gradually been moved to Table 3, one of the higher tables. His competition is stiffer than ever.

As the students arrive, Mr. Cartwright assigns them to their tournament tables, where they will compete to add points to their team scores. Jim worries a little as he sees who his two competitors are; one of them, Charlene, has a reputation as the smartest girl in the class, and the other, Luis, is a student who, like Jim,

had been winning consistently in the TGT tournaments. Could he come through for the Euclid Kids this week?

The TGT unit is on geometry. Jim, Luis, and Charlene pick cards to see who goes first, and Jim wins. He picks the first card, which has the number "21" on it. He looks down his game sheet for item 21, which reads: "What is the circumference of a circle with a diameter of 3 centimeters?"

This question hadn't been on the worksheets he had studied with his team, but Jim thinks he understands circles pretty well. He scribbles some figures on a piece of paper and says "18.8 centimeters."

Now Luis, sitting on Jim's left, has the right to challenge. He does some figuring and then challenges. "I think it's 9.4 centimeters." Charlene checks the answer sheet. "Luis is right," she says, "it's 9.4 centimeters. Jim, I think you were thinking of *radius* instead of *diameter*." Luis keeps card number 21 to count as his point for a correct answer, and picks the next card to indicate the next question in the tournament. Play continues around the table all period. At the end, Luis has received the most cards and thus contributes six points to his team's score; Jim is next, and thus contributes four; and Charlene is third, and contributes two points to her team's score. When the period is over, Jim finds his teammates and tells them how he did. They're glad that he did as well as he had against such tough competition. "I think we'll still be in the top three," one of his teammates says. "I won at my table and Susan won at hers. If we aren't in first place this week, we'll get 'em next week!"

As Jim is going home on the bus, he thinks about how much his feelings about school have changed since he began working in teams with other students. He recalls how much of a chore studying had been, and how he used to feel as if he didn't know many of the other students very well. School had changed from a place where the other students didn't care if you came to school or not to one in which other students called you up if you were out sick to see what had happened to you.

Teams and Basic Skills — The Research

Teams-Games-Tournaments. TGT has been evaluated in ten studies involving nearly 3000 students in schools across the country. In seven of the studies, TGT students learned significantly more than students in traditionally structured classes studying the same material. In the other three studies, TGT students learned only slightly more than the control students, but in no study have TGT students learned less. The effectiveness of TGT in increasing learning of basic skills has been demonstrated in grades three through nine, in subject areas ranging from mathematics to grammar to reading vocabulary, and in urban, suburban, and rural schools. The degree to which TGT has been researched and the consistency of its effects are unusual in education, and stand as a model for evaluation of newly developed techniques (2).

Student Teams-Achievement Divisions. STAD and a similar technique have been evaluated in five studies involving about 2000 students in grades four through nine. In three studies, STAD was significantly more effective than traditional methods in increasing basic skills learning; in the other two, STAD and control were equally effective. Interestingly, the effects of STAD have been like those of the Jigsaw technique (see below) in that its effects have been more dramatic for minority students than for whites. In one ten-week study, black students in a STAD class studying grammar and punctuation gained about 1.7 grade equivalents on a standardized language arts test. Whites in the STAD class also gained 1.7 grade equivalents. However, while whites in the *control* class gained 1.3 grade equivalents, blacks in the control class gained only 0.6. This means that although it was helpful for whites to be in the STAD class, it was extremely valuable for the blacks (3).

Jigsaw. As of this writing, the effects of the Jigsaw technique on basic skills learning have been evaluated in only one study. In that study, black and Chicano students in the Jigsaw classes learned more than their counterparts in traditional classes, but white students did about the same in either treatment. However, the study took place for only two weeks; a longer study might show greater effects (4).

It seems safe to say that team learning can have the effect that parents, school boards, and teachers are increasingly demanding: more learning of basic skills. In fact, in the case of TGT, the more the curriculum is oriented toward basic skills, the greater the learning. The three studies in which TGT students learned only slightly more than control students took place in social studies classes. In the seven studies in which there were significantly positive effects, the subject matters were grammar, punctuation, basic mathematics, and reading vocabulary. It also seemed that the more dull and drill-like the material, the more positively teachers and students reacted to TGT, probably because they knew how unusual it is to find a way to enjoy drill and practice.

Integrating the Desegregated Classroom

One of the most important effects that student learning teams have is on friendships between black and white students in desegregated classes. Anyone who has spent much time in a desegregated secondary school knows that white students associate mostly with white students while black students associate mostly with black students. Seeing this is always a blow to those who hoped that widespread desegregation would lead to greatly increased contact, and thereby respect and liking, among students of different races. We should probably have been less surprised; in most desegregated schools, black and white students come

from separate neighborhoods, ride different buses, and often come from different elementary schools.

In several studies in which team learning was not used, we asked beginning seventh graders in traditionally structured, racially mixed classes who their friends were. We repeated the question a semester later, and found that the proportion of blacks who named whites as their friends and whites who named blacks either stayed the same or actually dropped. Apparently, simply assigning black and white students to the same classes does not increase friendship across racial lines.

A Team Solution. Student learning teams are an obvious solution to this problem. We know from decades of research that when people work together for a common goal, they gain in respect and liking for one another. When we applied the team concept to desegregated classrooms, that is exactly what we found. In three studies, TGT students gained in the number of friends they named of the opposite race far more than did control students. Three additional studies found STAD to have the same effect. In fact, in many of these studies, the team students began to choose their classmates as friends as though race were not a barrier to friendship at all. This never happened in the control classes. The Jigsaw Method and techniques developed by David Johnson at the University of Minnesota have achieved the same results (5).

John and Sue Ann: Teams in Action. An example will illustrate what can happen in a team class. This was a fifth grade class that was just starting to use team learning. The teacher was announcing assignments to teams. She read off the name of a black student, John, and he took his place at a table that had been set up for team practice. John was one of the brightest students in the class. Then the teacher read off Sue Ann's name. Sue Ann was white, a poor student, and frequently absent. John was aghast and refused to work with her. Sue Ann refused to sit at the table with John. The teacher let Sue Ann sit away from the team until she was ready to join in, although her quiz scores still counted in the team score.

Two weeks later, things had changed. There were John and Sue Ann, chatting away about a lesson like old friends. The teacher was asked what had happened — there were two other students on the team, and John and Sue Ann could have worked with them. Why were they working together?

It turned out that John and Sue Ann were on a team that had a strong desire to win in the competition for team points. In particular, Sue Ann wanted to be mentioned in the newsletter so that she could impress her mother. After several days of working by herself, Sue Ann finally realized that she just wasn't getting the material. The other two members of the group had already been good friends, so they were always busy helping each other study. John usually finished early and then didn't have anyone to help. Sue Ann finally took the plunge — she asked John a question. Because John knew that the whole team had to do well, he answered her question and continued to explain some other things that he knew she didn't know. In a word, John and Sue Ann needed each other if they valued their team's success. That need led to the breakdown of a formidable set of barriers to friendship — black-white, male-female, and high achiever-low achiever. John and Sue Ann probably did not become best friends. But working on the team together made possible a level of contact and mutual good feeling that would have been quite unlikely otherwise.

Of course, not every team works perfectly, and in some cases long-standing friendship patterns are hard to break. However, because of the strength and consistency of the evidence, those of us who have been working with teams in desegregated settings now frankly believe that any desegregated school that is not using learning teams in some form is not doing all it can to improve relations between its minority and white students.

Liking of Others and Liking of Self

One of the justifications for many of the innovations of the late 1960's and early 1970's was that they would increase students' self-esteem — their feelings that they were important and valuable people. Some of these techniques achieved such results and others did not. However, all three of the research centers working on student team techniques have found that teams do increase students' self-esteem. Team-learning students have been found to like themselves more than students in traditional classes like themselves (6). Why does this occur? First, we consistently found that TGT and STAD students report that they like others and feel liked by others more than control students do. Liking others and feeling liked yourself are obvious components of feeling that you are a worthwhile person. Second, it seems likely that students feel (and are) more successful in their school work when they work in teams. This could also lead to an increase in self-esteem. Whatever the reason, the effect of teams on self-esteem may be particularly important in long-term effects on mental health. A student who has had a cooperative, mutually supportive experience in school may be less likely to be antisocial, wtihdrawn, or depressed in later life. We have only scratched the surface in understanding what kinds of long-term benefits for mental health might result from long-term experience of cooperative learning teams.

But Are Teams Practical?

Many of the innovations introduced in recent years have required enormous amounts of teacher training and/or money to actually implement. Fortunately, team techniques are quite simple. Hundreds of teachers across the country have implemented TGT in their

classes using only the manual. Many others have implemented STAD and Jigsaw entirely without outside aid. With nothing but this manual, you can successfully implement TGT, STAD, and Jigsaw in your classroom. If you have purchased curriculum materials from us, or if you can adapt your own existing materials to the team techniques, student team learning takes no more teacher time than traditional instruction, and the costs, even if you buy our curriculum materials, are minimal. In our experience, teachers have been more than pleased with team techniques. Many simply enjoy the pleasure their students experience. Others are happy to have techniques that allow them to become facilitators working with small groups, rather than directing all class activity. Still others are just glad to have a way to teach basic and often intrinsically uninteresting material without having to fall back on drill.

Implications for Educators

What does all this mean? It means that practical classroom methods are available to promote both major academic and non-academic goals of schools. We can do a better job of teaching basic skills, and reap benefits in terms of students' self-concepts and liking of others, including those of different races. Student Team Learning is inexpensive and easy to use, is applicable to any age level or curriculum, and it works. Learning team techniques appeal equally to teachers concerned with self-concept, positive intergroup relations, and student attitudes toward school and to teachers concerned with basic skills.

How to Use This Manual

The purpose of this manual is to give teachers the information they need to use Student Team Learning in their classrooms. It is written to stand alone without other information, but of course other ways of receiving the information are also helpful. At present, you may borrow or purchase a filmstrip and cassette tape that describe the major components of Student Team Learning from the Johns Hopkins Team Learning Project. Also, there is a growing number of people around the country who are able to give workshops on Student Team Learning techniques to groups of teachers or administrators. If you write us, we can put you in touch with such people in your area.

Choosing a Technique

Before you go further in this manual, you should choose the team technique that you plan to use. You may have already decided which you will use, but if not, the section below may help you choose.

Teams-Games-Tournaments. TGT is the most exciting and enjoyable of the team techniques. Its use of face-to-face competition on academic games is enjoyed by virtually all students. The games also provide extensive practice of the instructional materials. The game format makes time spent in TGT special — for example, students have been known to come in after school to resolve ties. The face-to-face competition does create a high level of noise and activity. Of course, the noise is a learning noise, but this does create problems in some schools or with some teachers. TGT is most appropriate for teaching basic skills materials that have one right answer. It is less appropriate for subjects such as literature study, social studies, and many parts of science; in these areas Jigsaw is more effective for most objectives (except for the recall and objective-question parts of those subjects).

Student Teams-Achievement Divisions. STAD is much less exciting than TGT because it replaces the games with quizzes. However, it is still enjoyed by students primarily because of the peer interaction on learning tasks in the teams. STAD takes less class time than TGT to cover the same material, but it requires somewhat more teacher time to grade the quizzes. STAD shares with TGT the particular focus on objective-answer type materials.

Jigsaw. Jigsaw is like STAD rather than TGT in terms of the level of excitement (and noise) generated. The peer tutoring is more structured in Jigsaw than in TGT or STAD, and there is more emphasis on the unique contribution that each student makes. Jigsaw is most appropriate in just the curriculum areas where TGT and STAD are least appropriate — literature, social studies, and concept-learning parts of science. Jigsaw also provides extensive practice in reading for meaning in whatever subject it is used. There are two forms of Jigsaw presented in this manual: Jigsaw II and original Jigsaw. Jigsaw II requires far less teacher preparation than original Jigsaw, but original Jigsaw has other benefits that may outweigh this additional effort. If you are planning to use Jigsaw, read the overviews for both forms to make a choice between them.

Rutabaga. Rutabaga is TGT adapted to oral reading in elementary school and shares TGT's benefits and drawbacks.

In summary, choose TGT or STAD if your curriculum material is objective, Jigsaw if it is conceptual, Rutabaga if you are teaching oral reading. Choose TGT over STAD if you want the excitement and extensive practice of academic games, or STAD over TGT if you want a quieter, less time-consuming method. This manual includes instructions for combining TGT and STAD to obtain the best features of both, and also describes a full-day cooperative model that uses all of the techniques, so you may choose one of these options as well.

Once you have made your choice, read the directions for the technique you have chosen *completely* before you begin. Many of the details of the techniques are explained in the instructions for introducing the techniques to students.

If you have never been to a student team learning workshop, it is a good idea to get together with other teachers and do a "dry run" of the techniques. This is particularly true for the games in TGT and for the general structure in Jigsaw — experiencing the techniques helps you anticipate student questions.

Whatever you do, don't worry! Hundreds of teachers have used team techniques with the manual alone, and we are unaware of any failures. The techniques are simple, and they make sense to students as well as teachers.

OVERVIEW

TGT is made up of five interlocking components: class presentations, teams, games, tournaments, and newsletters. These components are described below.

Class Presentations

Material in TGT is initially introduced in a class presentation. This is most often a lecture-discussion conducted by the teacher, but can include audio-visual activities. Class presentations in TGT differ from usual teaching only in that they must be clearly focused on the TGT unit. In this way, students come to know that they must pay attention carefully during the class presentation, because doing so will help them to do well in the tournament.

Teams

Teams are composed of four or five students, representing all levels of academic achievement in the class, all racial or ethnic groups, and both sexes. The major function of the team is to prepare its members for the tournament. After the teacher presents the material, the team meets to study. Each team has worksheets to help them study. Most often, the study takes the form of students quizzing one another back and forth from the worksheets to be sure that they understand the material.

The team is the most important feature of TGT. At every point emphasis is placed on doing your best for the team and on the team doing its best to help its members. The team provides the peer support for academic performance that is important for effects on learning, and the team provides the mutual concern and respect that are important for effects on such outcomes as improved race relations and increased self-esteem.

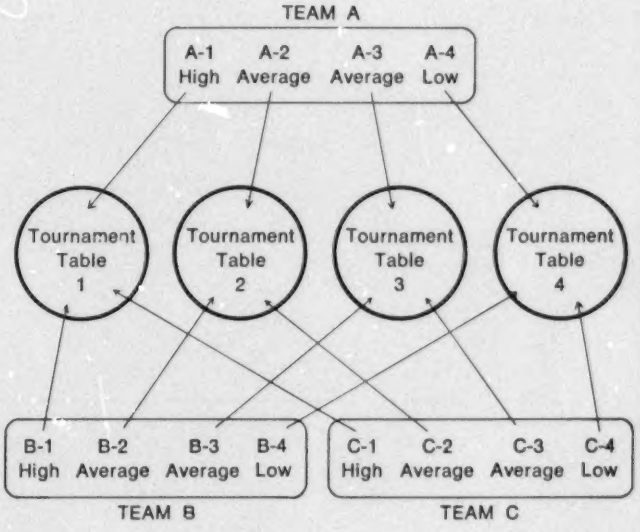
Games

The games are composed of simple, course content-relevant questions that students must answer. They are designed to test the knowledge gained by students from class presentations and during team practice. Games are played at tables of three students, each of whom represents a different team. Most games are simply numbered questions on a ditto sheet (see Appendix 3 for a sample game). A student picks a number card and attempts to answer the question that corresponds to the number. A challenge rule permits players to challenge each others' answers.

Tournaments

The tournament is the structure in which the games take place. It is usually held at the end of the week, after the teacher has made a class presentation and the teams have had time to practice with the worksheets. For the first tournaments, students are assigned to tournament tables by the teacher. The top three students in past performance are assigned to Table 1; the next three to Table 2; and so on. Figure 1 illustrates the relationship between teams and tournament tables. After the first week, however, students change tables depending on their own performance in the most recent tournament. The winner at each table is "bumped" to the next higher table (e.g., from Table 6 to Table 5); the second scorer stays at the same table; and the low scorer is "bumped down." In this way, if students have been misassigned at first, they will eventually be moved up or down until they reach their true level of performance.

Figure 1. Assignment to Tournament Tables



Newsletters

The newsletter provides the primary means of rewarding teams and individual students for their performance. Each week, the teacher prepares a newsletter to announce the outcome of the previous tournament. The newsletter emphasizes weekly team performance, but also recognizes individual table winners and keeps a record of cumulative team standings. In addition to the newsletter, many teachers use bulletin boards, special privileges, or other rewards to emphasize the point that doing well as a team is important. (See Figure 9 for a sample TGT newsletter.)

PREPARING TO USE TGT

There are two ways that TGT can be used. First, games and worksheets in many curriculum areas are available from the Johns Hopkins Team Learning Project. If you teach a subject covered by the Hopkins materials and choose to purchase them, you can avoid

most of the work involved in preparing to use TGT. These materials can also be used with STAD.

The second way TGT can be used is with your own materials, either from commercially printed texts or workbooks, or materials you prepare yourself. These directions for using TGT are based on your use of the Hopkins materials or your own materials. Appendix 3 contains instructions for making your own materials. The section below is based on your use of the Hopkins materials.

Preparing Materials for TGT

If you use materials purchased from the Johns Hopkins Team Learning Project, you will need to prepare the following materials for each TGT unit. The sequence of activities (usually on different days for each unit) is class presentations, followed by team practice sessions, followed by tournament games, followed by class newsletter.

- For **class presentations** (preceding both team practice sessions and tournament games), you will need to prepare a class lesson focusing on the specific TGT unit being used. Examine the objectives and exercises on the TGT worksheets and TGT game sheets that will be used after the class presentation on the selected unit to be sure that your class lesson and presentations focus on the learning objectives of the TGT activities that come next.

- For **team practice sessions** (which follow class presentations), you will need:

1. A copy of the **practice worksheet** for every two students in your class (for example, if you have 35 students in your class, you will need 18 copies). One copy of the worksheet is provided for each TGT unit in the Hopkins materials, so you will need to *duplicate enough copies* to have one for every two students in your class. You may make Xerox or Thermofax copies from the worksheet provided in the purchased materials, or you may copy the worksheet onto a ditto (Solvagraph) master to duplicate enough copies.
2. A copy of the **practice answer sheet** for every two students in your class. A practice answer sheet to accompany the practice worksheet for each unit is provided in the purchased materials. Again, you need to duplicate enough copies of the practice answer sheet to have one for every two students in your class.

- For **tournament game sessions** (which follow team practice sessions), you will need:

1. Several decks of **numbered cards.** These cards are provided in sufficient quantity in the Hopkins materials.
2. A copy of the **game sheet** for every three students in your class. One copy is provided in the purchased materials, so you will need to *duplicate* the game sheet to provide enough copies for every three students in your class. (For example, if you have 36 students in your class, you will need 12 copies.)
3. A copy of the **game answer sheet** for every three students in your class. One copy is provided in the purchased materials, so you will need to *duplicate* the game answer sheet to provide enough copies.
4. **Game score sheets.** You will need one copy for every three students in your class. Several game score sheets are provided in the Hopkins materials, enough for a few lessons. After that, you will need to duplicate copies.
5. One copy of the **tournament score sheet,** which is used to assign students to tournament tables for the game sessions.

- For the **class newsletter,** you will need:

1. **Team summary sheets** that are used by the teacher to record students' points from game score sheets to determine the *team total scores* that are to be reported in the class newsletter. You will need to make one copy for every four students in your class.
2. A **class newsletter** to be written and duplicated for each student to show standings of the teams and recent scores. Examples of how to prepare the class newsletter are given in this manual.

Assigning Students to Teams

A team in TGT is a group of four or five students who represent a cross-section of the class in past performance, race, and sex. That is, a four-person team in a class that is half male, half female, and three quarters white, one quarter minority would have two boys and two girls and three whites and one minority. The team would also have a high performer, a low performer, and two average performers. Of course, "high performer" is a relative term; it means high for the class, not high compared to national norms.

Students are assigned to teams by the teacher, rather than by choosing teams themselves, because students tend to choose others like themselves. You may take likes, dislikes, and "deadly combinations" of students into account in your assignment, but do not let students choose their own teams. Instead, follow these steps:

1. *Rank Students.* On one of your tournament score sheets, rank the students in your class from highest to lowest in past performance. Use whatever information you have to do this — test scores are best, grades are good, but your own judgment is fine. It may be difficult to be exact in your ranking, but do the best you can.
2. *Decide on the Number of Teams.* Each team should have four members if possible. To decide

how many teams you will have, divide the number of students in the class by four. If the number is even, the quotient will be the number of four-member teams you have. For example, if there are 32 students in the class, you would have eight teams with four members each.

If the division is uneven, the remainder will be one, two, or three. You can then have one, two, or three teams composed of five members.

3. *Assign Students to Teams.* When you are assigning students to teams, balance the teams so that (a) each team is composed of students whose achievement levels range from low to average to high, and (b) the average achievement level of all the teams in the class is about equal. There are two reasons for this. First, students with different achievement levels within a team can tutor each other. Second, by providing balanced teams, no single team has an advantage in tournament competition. To assign students to teams, make a list of students ranked by achievement. Next assign team letters to each student. For example, in an eight-team class you would use the letters A through H. Start at the top and bottom of your student list with the letter "A"; continue lettering toward the middle in both directions. When you get to the last team letter, continue the lettering in the opposite order. Figure 2 shows how such an assignment is done for a class with 34 students.

Notice that two of the students (17 and 18) in Figure 2 are not assigned at this point. They will be added to teams as fifth members, but first the teams should be checked for race and sex balance. If, for example, one-fourth of the class is black, approximately one student on each team should be black. If your class has more than two major ethnic groups, you should still assign students to teams to represent their proportion in the class. If the teams you have made based on achievement ranking are not evenly divided on both race and sex (they will hardly ever be balanced on the first try), you should change team assignments by switching students of the same approximate achievement level, but of different race or sex.

When you have done all of the switching for race and sex balance, you may verify that the ranks on the teams are indeed comparable by adding the team members' rank within the order list. Divide this sum by the number of team members. If none of the teams are more than 3 or 4 points from each other, you're doing fine. For example, in Figure 2 Team A's score is $1 + 16 + 19 + 34 = 70 \div 4 = 18.5$, while Team C $= 3 + 14 + 21 + 32 = 70 \div 4 = 18.5$. Even if students 17 and 18 had been added to either Team A or C the results would be comparable.

Figure 2. Assigning Students to Teams

	Rank Order	Team Name
High-Achieving Students	1	A
	2	B
	3	C
	4	D
	5	E
	6	F
	7	G
	8	H
Average-Achieving Students	9	H
	10	G
	11	F
	12	E
	13	D
	14	C
	15	B
	16	A
	17	
	18	
	19	A
	20	B
	21	C
	22	D
	23	E
	24	F
	25	G
	26	H
Low-Achieving Students	27	H
	28	G
	29	F
	30	E
	31	D
	32	C
	33	B
	34	A

The assignment of students as described above will produce "equal" teams on paper, but it does not consider factors such as the maturity of the teammates or poor combinations. For this reason, you may wish to make minor variations in your assignments. Teams can be viewed as having equal resources even though the sums of members' ranks are not exactly equivalent.

4. *Fill Out Team Summary Sheets.* After you have finished assigning students to teams, fill in the names of the students on each team on the enclosed team summary sheet, leaving the "team name" blank. Fill out the team summary sheets right away, while you are working on the team assignments. You will need them when you inform the students of their team assignments.

If you have six or more teams, divide them into two leagues. Teachers often name the two leagues

(an example would be American League and National League). The fact that one league might have one more team than the other (if you have an odd number of teams) is not important. What does count is that each league have at least three teams. By creating leagues you increase the chance that a given team will be in a winning place in the standings.

INTRODUCING TGT TO YOUR CLASS

Before you begin to use TGT in your class, you will need to have ready the following materials:

1. Your lesson plan for lesson 1.
2. Worksheet number 1 and answer sheets (one copy of each for every two students).
3. Game number 1 and answer sheets (one copy of each for every three students).
4. Team summary sheets filled out with the names of the team members (team name blank).
5. Your list of students ranked from highest to lowest in past performance on a tournament score sheet.

Suggested Schedule for Introducing TGT

Day 1	Day 2	Day 3	Day 4	Day 5
Teach Lesson 1 (or free day)	Teach Lesson 1	Introduce teams and team practice sessions (worksheets)	Team Practice	Tournament

Step 1: First Lesson

You will need:

- Your lesson plan for lesson 1.

Simply inform students that you will be starting a new unit. Then teach lesson 1, taking as many periods as you need.

Step 2: Introducing Team Assignments and Team Practice

You will need:

- One copy of the worksheet and answer sheet for lesson 1 for every two students.
- The team summary sheets filled out with team members' names (team name blank).

1. Introduce Teams

Explain the concept of teams and teamwork to the students. In your introduction, you might say the following:

"For the next several weeks, we are going to use a new way of learning. It is called 'TGT,' which stands for Teams-Games-Tournaments. In TGT, you will be working on a team. Being on a team and helping each other will help you learn the material we study in class. To see how well you learn, each of you will be playing in a tournament every week (or twice a week). In these tournaments you represent your team and earn points for your team.

"Each week you and your teammates will have a chance to work together to practice and help each other get ready to play the game. Today I am going to assign you to teams. I have arranged the teams so that each one has about the same number of 'A' students, 'B' students, and so on. I also set up the teams so that there are no all-boy or all-girl teams. In a moment you will have some time to work together and prepare each other for the game that we will play later this week."

2. Inform Students of Their Team Assignments

"Now I will tell you which team you will be on. When I read your name, find your teammates and sit next to them. Then choose a team name. Choose a good one, because you will use it for several weeks."

Read the names of the members of each team and point out a place for the team to assemble. Students should move desks together to face each other or move to common tables. While the teams are deciding on names, pass out two copies of the worksheet and answer sheet for lesson 1 to each team. Only two copies are given to each team to emphasize the notion that the worksheets are for team practice, not meant to be filled out and returned. Record the team names chosen by the teams on the team summary sheets.

3. Introduce Team Practice

When teammates have agreed upon a name, continue as follows:

"The purpose of the team you are in now is to prepare its members for a tournament that we will have each week. In the tournament, you will each have a chance to add points to your team scores by showing how much you have learned. Each team will have a chance to practice together the day before the tournament. The idea of team practice is to give teammates an opportunity to help each other learn so that the whole team can do well in the tournament. You may practice as a team however you wish, but I will show you one way of practicing that may help you.

"You have in front of you a worksheet and an answer sheet covering the material I just presented. Every team should have two worksheets and two answer sheets. Find your worksheets and answer sheets."

Allow time for students to find worksheets and answer sheets. Then ask for a volunteer to help you

demonstrate team practice. Make sure you have everyone's attention before you continue with the following:

"If you look at the worksheet you will see a set of instructions and a list of items. The game you will be playing in the tournament will have questions like those on the worksheet. Your job as a team will be to try to teach every item on the worksheet to every team member. To do this, you should first divide into groups of two or three within your teams. Then you may quiz each other on the items. If your partner makes a mistake, try to help him or her understand the rule that is involved, as well as learn the correct answer. In other words, you will be each others' teachers. I will show you how this works."

Demonstrate peer tutoring with your volunteer. Use examples from your first lesson or any other worksheet, or you may use the following examples. If you do, say to your volunteer: "I'm going to read you some groups of words, and I want you to tell me if they are *sentences* or *non-sentences*."

A. *The cat.*

(Allow the volunteer to respond. If he or she says "non-sentence," say "You're right. 'The cat' is not a sentence because it does not express a complete thought and does not contain a verb. If I said 'The cat sings,' I would have had a complete sentence, because 'sings' is a verb and the sentence now expresses a complete thought." If the volunteer responds incorrectly, correct him or her and give the same explanation.)

B. *The elephant stepped on Sam.*

(Allow the volunteer to respond, and explain the answer as above. Then let the volunteer quiz you from your own worksheet to show that the tutoring is a two-way process. Make some mistakes on purpose to let the volunteer practice correcting you.)

Then continue as follows:

"Now you may divide into groups of two or three within your teams and begin to quiz each other on the worksheet items. Use the answer sheets to check your answers. If you don't understand an answer, first discuss it with your teammates, and then you may ask me. Do *not* write on the worksheets — they are only for you to practice with. The idea is to use the worksheets to learn and to help your teammates learn — you are not finished with your worksheets until you and all of your teammates know the material. The tournament on this material will be held soon, so be sure to study well today. Are there any questions? . . . Go ahead and form into groups of two or three in your teams and practice with your worksheets."

Allow students to work in teams for the remainder of the period.

Step 3: Continued Team Practice

You will need:

- Team summary sheets.
- Enough copies of the worksheet and answer sheet for lesson 1.

Team Practice

As students come into class, have them move their desks to get into their teams again. You may need to remind students of their team assignments. If you wish, you may take ten or fifteen minutes to review your lesson. Then pass out two copies of the first worksheet to each team. Do not encourage students to write on their worksheets (but you may allow them to use scratch paper). Try to reinforce the idea that the worksheets are study aids, not something that should be filled out and handed in. Let students work in their teams for the rest of the period.

One problem that sometimes arises at this point is that of students who study for five or ten minutes and then say they are finished. If this happens, remind students that they will soon be in a tournament in which they will need to know the material. If students claim to know the material, remind them to help those on their teams who do not — the whole team has to do well if they are to be successful as a team.

Step 4: Introducing the Tournaments

You will need:

- One copy of a game sheet, answer sheet, game score sheet and one set of numbered cards for every three students.
- Your tournament score sheet, with the students listed from highest to lowest in past academic performance.

Before you begin:

In the column marked "Table Assignment" on the tournament score sheet, put a "1" for the first three students on the list, a "2" for the second three, etc. If there is only one student left at the bottom, make a four-person table; if two, make two four-person tables. Also, avoid putting two students on the same team at the same tournament table. If two teammates would be at the same table, change one to the next table up or down.

Before you begin you should play the TGT game with friends to familiarize yourself with the rules. The rules are much easier to learn if you actually experience them! Whether you play the game yourself or not, make absolutely sure that you completely understand the game rules before you start.

1. Introduce the Tournament to Students.

In introducing your students to the tournament, you might say the following:

"Yesterday you all worked in your teams to learn the material we have been studying. Today you will get your chance to show how much you

learned in your teams. Each of you will play a game in competition with other students who have done about as well as you have in this subject. Any points you win in the game will be points for your team.

"In a moment I will assign you to tables to play the game. You will play against different players each week, although your team will always remain the same. Each of you should have a good chance to win at your table, because the competition will always be fair.

"After today's tournament, you will all receive a class newsletter that will announce the winning teams and the students who contributed the most to their teams' scores. Do your best in the games, because your team is rooting for you!"

2. Assign Students to Tables.

If you don't want to emphasize your students' ranks, do not read the table assignments in order. Give each table a deck of numbered cards, a game sheet, an answer sheet, and a game score sheet.

3. Introduce the Game.

Explain the purpose and the rules of the game. In explaining the rules, you should ask one table (three students) to come to the front of the class to demonstrate what a table does at each step in the game. The game rules are illustrated in Figure 3.

Figure 3. Game Rules

Reader
1. Picks a numbered card and finds the corresponding question on the game sheet.
2. Reads the question out loud.
3. Tries to answer.

1st Challenger
Challenges if he wants to (and gives a different answer), or passes.

2nd Challenger
Challenges if 1st challenger passes, if he wants to. When all have challenged or passed, 2nd challenger checks answer sheet. Whoever was *right* keeps the card. If the *reader* was wrong, nothing happens, but if either *challenger* was wrong, he or she must put a card back in the deck.

To start the game, the students pick cards to see who is the first reader. The student with the highest number goes first. As is shown in Figure 3, play proceeds in a clockwise direction from the first reader.

When the game begins, the reader shuffles the cards and picks the top one. He or she then reads the question corresponding to the number on the card out loud, including the possible answers if the question is multiple choice. For example, if the student picks card number 21, he or she answers question number 21. The reader is allowed to guess without penalty if he or she isn't sure about the answer. After the reader has given an answer, the student to his or her left (first challenger) has the option of challenging, and giving a second answer. If he or she passes, the second challenger may challenge. Challengers have to be careful, though, because they *lose* a card if they are wrong. When everyone has answered, challenged, or passed, the second challenger checks the answer sheet and says who was right. Whoever was right gets to keep the card. If either challenger was wrong, they have to put a previously won card back in the deck (if they have one). If no one is right, the card goes back in the deck.

For the next round, everything moves one space to the left — the first challenger becomes the reader, the second challenger becomes the first challenger, and the reader becomes the second challenger. Play continues until the period ends or the deck is exhausted. When the game is over, players count their cards and put the number they won on the game score sheet. If there is still time, students may reshuffle the cards and play a second game until the end of the period.

4. Play the Game.

All the students should play the game at the same time. While they are playing, move from group to group to answer questions and be sure that everyone has the right idea. Ten minutes before the end of the period, call "time" and have students stop and count their cards. They should then fill in their names and scores on the game score sheet, as in Figure 4.

5. Calculate Game Scores and Tournament Points.

Have students add up the scores they won in each game (if they played more than one) and fill in their *day's total*. If you have young children (fourth grade or below), simply collect the score sheets. If your students are older, you may have them calculate their *tournament points* as indicated in Figure 5. That is, have students give the top scorer six points, the second scorer four points, and the third scorer two points at a three-person table with no ties. If there are more or less than three players or if there are any ties, use Figure 5 to tell students what to do. When everyone has calculated their *tournament points*, have a student collect the game score sheets. While he or she is doing so, you may take final questions or comments, and then dismiss the class.

Figuring Team Scores

As soon as possible after the tournament, you should figure team scores and write the class newsletter to

Figure 4. Sample Game Score Sheet

Table #_____ *Game Score Sheet* Round # 5

Player	Team	Game 1	Game 2	Game 3	Day's Total	Tournament Points
ERIC	GIANTS	5	7		12	2
LISA A.	GENIUSES	14	10		24	6
DARRYL	B.B	11	12		23	4

Figure 5. Calculating Tournament Points

FOR A FOUR-PLAYER GAME

Player	No Ties	Tie For Top	Tie For Middle	Tie For Low	3-Way Tie For Top	3-Way Tie For Low	4-Way Tie	Tie For Low and High
Top Scorer	6 points	5	6	6	5	6	4	5
High Middle Scorer	4 points	5	4	4	5	3	4	5
Low Middle Scorer	3 points	3	4	3	5	3	4	3
Low Scorer	2 points	2	2	3	2	3	4	3

FOR A THREE-PLAYER GAME

Player	No Ties	Tie For Top Score	Tie For Low Score	3-Way Tie
Top Scorer	6 points	5	6	4
Middle Scorer	4 points	5	3	4
Low Scorer	2 points	2	3	4

FOR A TWO-PLAYER GAME

Player	No Ties	Tied
Top Scorer	6 points	4
Low Scorer	2 points	4

Figure 6. Sample Team Summary Sheet

Team Name GENIUSES

Team Members	1	2	3	4	5	6	7	8	9	10
MARK	6	2	2	4						
KEVIN	4	4	2	6						
LISA A.	5	2	4	6						
JOHN F.	6	6	2	4						
DEWANDA	4	4	6	2						
Total Team Score	25	18	16	22						
Transformed Team Score	20	14	13	18						
Team Standing This Week	1	3	5	3						
Cumulative Score	20	34	47	65						
Cumulative Standing	1	1	2	2						

announce the standings. To do this, first check the *tournament points* on the game score sheets corresponding to the *day's totals*. Then, simply transfer each student's tournament points to the team summary sheet for his or her team, and add up all the team members' scores. If the team has four members, you are finished. However, if the team has more or less members than four, you will need to transform the scores to be fair in comparing team scores. Appendix 2 gives transformed scores for all possible team sizes and numbers of points. For example, if a five-member team receives a total score of 22, the team will receive a transformed score of 18. Only the transformed scores for three- or five-member teams should be considered in determining the team rank. The cumulative score the team has made to date is also recorded on the team summary sheet. Of course, it is the transformed scores that are used to get the cumulative score.

Figure 6 shows how scores are recorded and totaled for one team. Note that because this team has five members, the total team scores have been transformed to be comparable to the scores of four-person teams.

Bumping — Reassigning Students to Tournament Tables

Bumping, or reassigning students to new tournament tables, must be done after each tournament to get ready for the next tournament session. It is easiest to do the bumping at the same time as you figure team scores and write the newsletter. Use a tournament score sheet for this purpose.

To "bump" students, follow these steps. A diagram of the bumping procedures is shown in Figure 7, and Figure 8 shows how the bumping procedure might work for a hypothetical class after two tournaments (one tournament per week).

1. Use the game score sheets to find out who were the winners and losers at each tournament table. On the tournament score sheet, *circle* the table assignments of all students who were *winners* at their tables. If there was a tie, flip a coin to decide which number to circle — do not circle both. In Figure 8, Tyrone, Maria, Tom, Carla, and Ralph were table winners in the first tournament, so their table numbers are circled in the first column; Tyrone, Liz, John T., Tanya, and Ruth were winners in the second tournament, so their numbers are circled in the second column.

2. *Underline* the table numbers of students who were *low scorers*. Again, if there was a tie for lowest score at any table, flip a coin to decide which to underline; do not underline more than one number per table. In Figure 8, Sarah, John T., John F., Jim, and Shirley were low scorers at their respective tables in the first tournament; Sam, Sylvia, Tom, John F., and Kim were low scorers in the second tournament.

3. Leave all other table assignments as they were, including numbers for absent students.

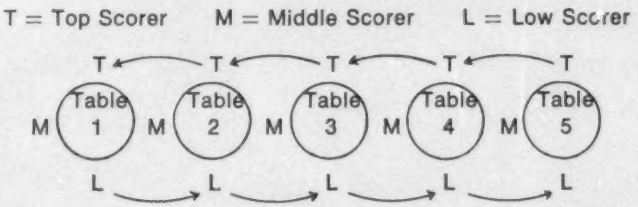
4. In the column for the next tournament, transfer the numbers as follows:

If a number is *circled, reduce* it by one ((4) becomes 3). This means that the winner at Table 4 will compete at Table 3 next week, a table where the competition will be more difficult. The only exception is that (1) remains 1, because Table 1 is the highest table. If the number is *underlined, increase* it by one (4 becomes 5), except at the lowest table, where the low scorer stays at the same table (e.g., 10 remains 10). This means that the low scorer at each table will compete next week at a table where the competition will be a little less difficult. If the number is *neither underlined nor circled,* do not change it for the next tournament — transfer the same number.

In Figure 8, note that Tom won at Table 3 in the first tournament and was bumped up to Table 2. At Table 2 he was the low scorer, so for the third week's tournament he will compete at Table 3 again. Sylvia was the middle scorer at Table 3 in the first tournament, so she stayed at Table 3; then she lost in the second tournament and is moved to Table 4.

5. Count the number of students assigned to each table for next week's tournament. Most tables should have three students; as many as two may have four. If table assignments do not come out this way, make some changes in table assignments so that they do.

Figure 7. Tournament Bumping Procedures



Note that in Figure 8, Tyrone won at Table 1 twice, but did not change tables because there was no place to go higher than Table 1. Shirley and Kim lost at Table 5, but were not "bumped down" because Table 5 is the lowest table.

Publicizing the Results

The motivational force that TGT generates is greatly enhanced when public announcements, bulletin board displays, and newsletters are used to publicize the tournament results and indicate their importance. Of the three, the newsletter is perhaps the most effective in creating a sense of excitement regarding the tournament and the students' performances.

The newsletter is also easy to produce. It can be written or typed on a ditto master and then run off and distributed to each student. It is best to have the newsletter out as soon as possible after each tournament if you are using weekly games, or after every second tournament if you are playing the games twice a week.

Figure 8. Sample Tournament Score Sheet With Bumping (Five Tournament Tables)

TOURNAMENT SCORE SHEET (TGT)

Tournament Number:

Student	Team	1	2	3	4	5	6	7	8	9	10	11	12	13
SAM	Orioles	1	1	2										
SARAH	Cougars	1	2	2										
TYRONE	Whiz Kids	(1)	(1)	1										
MARIA	Geniuses	(2)	1	1										
LIZ	Orioles	2	(2)	1										
JOHN T.	Cougars	2	(3)	2										
SYLVIA	Whiz Kids	3	3	4										
TOM	Geniuses	(3)	2	3										
JOHN F.	Orioles	3	4	5										
TANYA	Whiz Kids	4	(4)	3										
CARLA	Orioles	(4)	3	3										
KIM	Cougars	4	5	5										
CARLOS	Geniuses	4	4	4										
SHIRLEY	Whiz Kids	5	5	5										
RALPH	Cougars	(5)	4	4										
RUTH	Geniuses	5	(5)	4										

Results of Most Recent Tournament ↑ ↑ Tournament Table Assignment for Next Tournament

Figure 9. Sample TGT Newsletter

The Weekly Planet

4th Week March 28

FLASH! Fantastic Four Sweeps Language Arts Tournament!

The Fantastic Four was the winning team this week with a total of 22 points. John T., Kris, and Alvin put in outstanding performances for the Four, each contributing six points to their team. Their victory brings the Four to second place in the National League standings, only six points behind the leading Giants!

Hot on the heels of the Fantastic Four were the Brain Busters with 21 points. Anita and Tanya helped the team out with victories at their tables, while Peter tied for first t his. The Brain Busters are still in third place in National League competition, but are moving up fast!

Third this week were the American League Geniuses with 18 points. They were helped out by Kevin and Lisa A., both table winners. Other table winners were Lisa P. of the Daredevils and Mike of the Grammar Haters.

THIS WEEK'S SCORES

1ST--Fantastic Four		2ND--Brain Busters		3RD--Geniuses	
John T.	6	Anita	6	Mark	4
Mary	4	Peter	5	Kevin	6
Kris	6	Darryl	4	Lisa A.	6
Alvin	6	Tanya	6	John F.	4
	22		21	Dewanda	2
					22/18

Daredevils		Giants		Chipmunks		Grammar Haters	
Lisa P.	6	Robert	4	Caroline	5	Sarah	2
Henry	2	Eric	2	Jerry	2	Willy	2
Cindi	4	Sharon	2	Charlene	3	Mike	6
Fred	4	Sylvia	4	James	2	Theresa	3
						John H.	2
	16		14		12		15/12

SEASON'S STANDING FOURTH WEEK

National League		American League	
TEAM	SEASON SCORE	TEAM	SEASON SCORE
Giants	78	Grammer Haters	74
Fantastic Four	72	Geniuses	65
Brain Busters	66	Daredevils	57
Chipmunks	59		

When the team summary sheets are completed (see Figure 6), it is easy to transfer the information for the last recorded round into the newsletter format. The team summary sheets contain columns for several rounds (weeks) of the tournament. After the sheets are completed, it is simply a matter of sorting them, once to rank the team scores for the day from highest to lowest, and once to rank the team scores for the season. Then transfer the information to the newsletter.

A sample TGT newsletter is reproduced in Figure 9. You will want to use your own style to individualize the newsletter for your class, but the following information should appear in each newsletter:

1. A record of the performance of each team in the most recent tournament(s), including each team's rank for the week. This is the most important piece of information. The members of the teams in first, second, and third place that week should also be included.
2. Cumulative team standings.
3. Tournament table winners (omitting at which table the student won).
4. A complete listing by team of the tournament points earned by each student. (Optional)

The newsletter can be both informative and fun to read. You will want to highlight the week's successful teams and mention the tournament table winners and also encourage teams or individuals who did not win but did better than usual.

On the day you distribute the newsletter, announce the winning teams to the entire class and make it clear that team success is important to you. If you are holding a tournament more than once a week, announce the team scores after each tournament, even though there will be only one newsletter per week. The more enthusiasm you show, the more importance the students will attach to team success. In addition to the usual newsletter features, you might include a note to parents explaining TGT and the newsletter. Your statement could be modeled on the following:

Dear Parents:

This newsletter is part of a new program in _____'s class. This program is called Teams-Games-Tournaments, or TGT. In TGT, students work on learning exercises to add points to a team score. The teams work together to prepare their members for the games. Being on a winning team or contributing a high number of points to a team is an honor, as it indicates that a student has worked well with his or her team.

If you have any questions or comments, please share them with me.

Weekly Schedule After the First Week

After the introductory week, we recommend the following weekly schedule for TGT:

Mon.	Tues.	Wed.	Thurs.	Fri.
Teach Lesson (or other activity)	Teach Lesson (or other activity)	Teach Lesson	Team Practice	Tournament

Of course, you may change this schedule to fit your needs; for example, some teachers have used two tournaments per week. If your lesson takes only one period, use the two extra days for other activities. "Other activities" could include anything outside of the TGT unit. For example, in an English class you might use Monday and Tuesday for literature study, and Wednesday, Thursday, and Friday for a TGT grammar unit. In math, you might teach Roman numerals on Monday and Tuesday and switch to a TGT unit on area for the rest of the week.

Ending the Tournament

You should end the tournament after six to ten weeks. If you use TGT for more than ten weeks, break the time into at least two separate tournaments. When you decide to end the tournament, give the teams at least a week's notice. They will want to prepare for the final round and try to improve their season record. If you plan to continue with TGT, reassign the teams and start all over again. This gives students who have been on losing teams a chance to do better, and gives everyone a chance to make new friends.

If you have leagues in your class, arrange a playoff in which the top teams from both leagues compete on the final day of the tournament. If two four-person teams are involved, create four two-person tournament tables, with the top players from both teams competing at Table 1, the second most successful players at Table 2, etc. Be sure to tell the playoff teams which game(s) will be used, to give them a chance to prepare.

If you have several TGT classes in your school, an interclass playoff can be an exciting conclusion for the students. After determining the top team in each class, have this team represent the class. These playoffs are often conducted by teachers during after-school hours to avoid scheduling problems. The results of the playoff should be shared with all the participating classes, and ideally, with the entire school. Such playoffs will be a rewarding experience for both you and the students. In contrast to most academic competitions in which only the brightest students participate, TGT tournaments involve students from all ability levels.

Student Teams-Achievement Divisions

STAD is a simplification of TGT. STAD replaces the TGT games with a quiz. This reduces the classroom time required to use a team technique, although it requires the teacher to spend somewhat more time after class grading quizzes. STAD is clearly focused on team cooperation and does not include individual competition as in TGT. You may use STAD in combination with TGT, alternating quizzes with games.

OVERVIEW

The class presentations, teams and team practice, worksheets, and class newsletter used in STAD are the same as those used in TGT. Games and tournaments are not used; they are replaced by quizzes and by a system called "bonus points" that specifically reward students for special improvement on any given quiz.

Quizzes

The quizzes in STAD are just like the game sheets in TGT. The same sheets can be used as quizzes or game sheets. For instructions on making your own worksheets and quizzes, see Appendix 3.

Quiz scores are made into team scores by first transforming them into "points" comparable to TGT points, and then summing the contributions made by each team member. The individual contributions also include "bonus points" (see below).

Bonus Points

The idea behind bonus points is to make it possible for low or average achieving students to make an outstanding contribution to their team scores if they do their best on a quiz, regardless of what their "best" is. Students receive bonus points if they do better on a given quiz than others who have done about as well as they have in the past. To make this comparison easier, students who are about the same in past performance are assigned to six-member "achievement divisions." When a student's score stands out significantly from those of the five other students in his or her division, the student earns four bonus points; if the student is the highest in his or her division but is not substantially different from the rest of the division, he or she receives two bonus points. These points are in addition to the points earned on the quiz itself.

PREPARING TO USE STAD

Materials

The materials for STAD are the same as for TGT. The worksheets and answer sheets are the same, and the game sheets in TGT can be used as quizzes in STAD. Also, you will use quiz score sheets instead of tournament score sheets (see Figure 10).

Assigning Students to Teams

Assign students to teams exactly as you would for TGT (see p. 11).

Assigning Students to Initial Achievement Divisions

On a quiz score sheet, make a list of the students in your class ranked from highest to lowest in past performance, using whatever information you have — test scores, grades, or your own judgment are all appropriate criteria. Then assign the top six students to Division 1, the next six to Division 2, and so on. If there are one or two students left over, combine them with the last division; if there are three or more you may have a small division. Do not inform students of their divisional assignments: divisions are useful only as reference groups for students' scores.

INTRODUCING STAD TO YOUR CLASS

Before you begin to use STAD in your class, you will need the following materials:

1. Your lesson plan for lesson 1.
2. Worksheet number 1 and answer sheets (one of each for every two students).
3. Quiz number 1 (one for each student).
4. Team summary sheets filled out with the names of the team members (team name blank).
5. Your list of students ranked from highest to lowest in past academic performance on a quiz score sheet, with initial division placements filled in.

Suggested Schedule for Introducing STAD

Day 1	Day 2	Day 3	Day 4
Teach Lesson 1 (or free day)	Teach Lesson 1	Introduce Teams and Team Practice sessions (worksheets)	Team Practice --- **Quiz**

Step 1: First Lesson

You will need:

- Your lesson plan for lesson 1.

Simply inform students that you will be starting a new unit. Then teach lesson 1, taking as many periods as you need.

Step 2: Introducing Team Assignments and Team Practice

You will need:

- One copy of the worksheet and answer sheet for every two students.
- The team summary sheets filled out with team members' names (team name blank).

1. Introduce Teams

In your introduction, you might say the following:

"For the next several weeks, we are going to use a new way of learning. It is called 'STAD', which stands for Student Teams-Achievement Divisions. In STAD, you will be working on a team. Being on a team and helping each other will help you learn the material we study in class. To see how well you learn, each of you will take quizzes on the material I present in class and you study in your teams. The better you do on these quizzes, the higher your team score.

"Each week you and your teammates will have a chance to work together to practice and help each other get ready to take the quizzes. Today I am going to assign you to teams. Then you will have some time to work together and prepare each other for the quiz that you will take tomorrow."

2. Inform Students of Their Team Assignments

"Now I will tell you which teams you will be on. When I read your name, find your teammates and sit next to them. Then choose a team name. Choose a good one, because you will use it for several weeks."

Read the names of the members of each team and point out a place for the team to assemble. Students should move desks together to face each other or move to common tables. While the teams are deciding on names, pass out two copies of the worksheet and answer sheet for lesson 1 to each team. Record the team names chosen by the teams on the team summary sheets.

3. Introduce Team Practice

When teammates have agreed upon a name and settled down, continue as follows:

"The purpose of the team you are in now is to prepare its members for quizzes that we will have each week. On the quizzes, you will each have a chance to add points to your team scores by showing how much you have learned. Each team will have a chance to practice together the day before the quiz. The idea of team practice is to give teammates an opportunity to help each other learn so that the whole team can do well on the quizzes. You may practice as a team however you wish, but I will show you one way of practicing that may help you.

"You have in front of you a worksheet and an answer sheet covering the material I just presented. Every team should have two worksheets and two answer sheets. Find your worksheets and answer sheets."

Allow time for students to find worksheets and answer sheets. Then ask for a volunteer to help you demonstrate team practice. Make sure you have everyone's attention before you continue with the following:

"If you look at the worksheet you will see a set of instructions and a list of items. The quiz you will take tomorrow will have questions like those on the worksheet. Your job as a team will be to try to teach every item on the worksheet to every team member. To do this, you would first divide into groups of two or three within your teams. Then you may quiz each other on the items. If your partner makes a mistake, try to help him or her understand the language rule that is involved, as well as learn the correct answer. In other words, you will be each others' teachers. I will show you how this works."

Demonstrate peer tutoring with your volunteer. Use examples from your first lesson or any other worksheet, or you may use the following examples. If you do, say to your volunteer: "I'm going to read you some groups of words, and I want you to tell me if they are *sentences* or *non-sentences*."

A. *The cat.*

(Allow the volunteer to respond. If he or she says "non-sentence," say "You're right. 'The cat' is not a sentence because it does not express a complete thought and does not contain a verb. If I said 'The cat sings,' I would have had a complete sentence, because 'sings' is a verb and the sentence now expresses a complete thought." If the volunteer responds incorrectly, correct him or her and give the same explanation.)

B. *The elephant stepped on Sam.*

(Allow the volunteer to respond, and explain the answer as above. Then let the volunteer quiz you from your own worksheet to show that the tutoring is a two-way process. Make some mistakes on purpose to let the volunteer practice correcting you.)

If there is still time in the period, continue as follows:

"Now you may divide into groups of two or three within your teams and begin to quiz each other on the worksheet items. Use the answer sheets to check your answers. If you don't understand why an answer is as it is, first discuss it with your teammates, and then you may ask me. Do *not* write on the worksheets — they are only for you to practice with. The idea is to use the worksheets to learn and to help your teammates learn — you are not finished with your worksheet until you and all of your teammates know the material. The quiz on this material will be given tomorrow, so be sure to study well today. Are there any questions? . . . Go ahead

and form into groups of two or three in your teams and practice with your worksheets."

Allow students to work in teams for the remainder of the period.

Step 3: Team Practice and Quiz

You will need:

- Team summary sheets.
- Enough copies of the worksheet and answer sheet for lesson 1.
- Enough copies of the first quiz for each student.

1. Team Practice

As students come into class, have them move their desks to get into their teams again. You may need to remind students of their team assignments. If you wish, you may take ten or fifteen minutes to review your lesson. Then pass out two copies of the first worksheet to each team. Do not encourage students to write on their worksheets (but you may allow them to use scratch paper). Try to reinforce the idea that the worksheets are study aids, not something that should be filled out and handed in. Let students work in their teams for the rest of the period.

One problem that sometimes arises at this point is that of students who study for five or ten minutes and then say they are finished. If this happens, remind students that they will soon be taking a quiz in which they will need to know the material. If students claim to know the material, remind them to help those on their teams who don't — the whole team has to do well if they are to be successful as a team.

2. Quiz

Fifteen minutes before the end of the class period, have students put away all materials and take the quiz. Have students move their desks apart if possible to minimize the possibility of copying.

After Quiz Day

Scoring Quizzes and Assigning Points. As soon as possible after the day on which you give the quizzes, score the students' quizzes. On each student's quiz put the number or percentage right and the number of points earned. Give points the way you give grades, establishing a curve or using a set percentage criteria. Appendix 1 contains a score-to-percentage converter. The chart below gives the points for each grade. You may or may not wish to put the actual grades on student's papers, but do put the points on each, including bonus points (see below).

Bonus Points. In addition to the points listed above, students can earn "bonus points" for doing better than expected. The rationale for bonus points is outlined in the overview. One or two students at most should earn *four* bonus points for exceptional increases over their usual performance levels; several additional students may earn *two* bonus points for doing better than the others in their achievement divisions.

Suggested Point Criteria

Grade	*Number of Points*
A	6
B+	5
B	4
C+	3
C	2
D	1
F	0

In giving bonus points, be sure to take into account the difficulty of the quiz. A perfect paper may not be exceptional for a good student on an easy quiz, but an 85% score might be exceptional for a poor student on a difficult quiz. The purpose of the achievement divisions is to provide a reference point for bonus points. In most cases, the students who scored the highest in their divisions are those that should receive bonus points. However, sometimes none of the scores in a division stand out from the others at all, in which case no one should receive bonus points; in others, two or more students in a division have clearly done a better job than usual, and you might give bonus points to more than one student in a division.

When you have figured the bonus points, put the scores, points, and bonus points for each student on the quiz score sheet. Figure 10 illustrates a quiz score sheet.

Changing Divisions

After a few weeks, it is often apparent that some students are not in the most appropriate divisions. Some may be consistently earning bonus points, and others seem to be trying but are scoring well below the others in their divisions. When this happens, do not hesitate to change division assignments to make it a little easier or a little harder for students to earn bonus points. Again, do not tell students about their divisional assignments.

Try to avoid always giving four bonus points to the same students. Even very good students can earn bonus points, particularly if they get perfect or near-perfect scores on difficult quizzes. However, most bonus points should be given to low or average performing students to give those students a special incentive to do their best and to motivate their teammates to spend extra time helping them. Also, avoid giving bonus points too freely, or they will lose their uniqueness.

Team Scores

Team scores are figured just as in TGT. Simply put the points each student earns (including bonus points, if any) on his team summary sheet, and then add up the team scores. If there are more or less than four team members, use Appendix 2 or prorate the scores.

Newsletters

Regardless of whether you give one or two quizzes per week, you should prepare one newsletter each

Figure 10. Quiz Score Sheet (STAD and Jigsaw)

Student	Team	QUIZ # 5 Div.	Score (%)	Points	Bonus Points	QUIZ # _____ Div.	Score (%)	Points	Bonus Points
ANDREA	L.P.	1	96	6					
EILEEN	EIN.	1	100	6					
RALPH	TIGERS	1	92	5					
JIM	FRAC.	1	100	6					
DEREK	BRAINS	1	100	6					
MARIA	CALC.	1	88	4					
SUSAN	EIN.	2	76	2					
ROY	M.M.	2	92	5					
WILLY	CALC.	2	96	6					
TOM	FRAC.	2	84	4					
SARA	TIGERS	2	100	6	2				
MARTHA	L.P.	2	100	6	2				
DONNA	M.M.	3	84	4					
CHARLENE	BRAINS	3	96	6	2				
ANDY	FRAC.	3	80	3					
BRAD	EIN.	3	68	1					
LEONA	TIGERS	3	80	3					
CHARLES	L.P.	3	96	6	2				
DAWN	BRAINS	4	68	1					
JOHN S.	CALC.	4	100	6	4				
PAT	L.P.	4	76	2					
MARTIN	M.M.	4	96	6	2				
JOEL	FRAC.	4	80	3					
TANYA	M.M.	4	72	2					
LISA	EIN.	5	96	6	2				
JOE	TIGERS	5	88	4					
SCOTT	L.P.	5	64	1					
SAMANTHA	CALC.	5	92	5	2				
TODD	BRAINS	5	60	1					
MARY	BRAINS	5	72	2					

Figure 11. Sample STAD Newsletter

THE LITTLE LEOPARD

JONESVILLE ELEMENTARY SCHOOL

ISSUE NO. 5
MARCH 21, 1978

Calculators Outfigure Class in STAD Competition

The Calculators (Maria, John S., Samantha, and Willy) calculated their way into first place this week, with double bonus points earned by John S., and single bonus points earned by Samantha. Their big win this week moves the Calculators into third place in the overall standings--not bad for a team that started last! The Tigers (Ralph, Joe, Sara, and Leona) clawed their way into a second place tie with the Little Professors (Scott, Andrea, Charles, Martha, and Pat). Sara won bonus points for the Tigers and Charles and Martha both won bonus points for the Little Professors. The Little Professors stay in fourth place in the overall standings, but now score just behing the Calculators. First place in the overall score is still the Math Monsters (Roy, Martin, Tanya, and Donna), but their fourth place this week gives the hard-charging Tigers a good chance to leap into the lead next week! Martin won bonus points for the Math Monsters. Other bonus point winners were Lisa (Einsteins) and Charlene (Brains).

This Week's Rank		This Week's Score	Overall Score	Overall Rank
1st -	Calculators	27	94	3
(Tie) 2nd -	Tigers	20	102	2
(Tie) 2nd -	Little Professors	20	90	4
4th -	Math Monsters	19	105	1
5th -	Einsteins	17	72	7
6th -	Fractions	16	85	5
7th -	Brains	14	81	6

Bonus Points and Perfect Papers

Double Bonus	-	John S.	(Calculators)
Bonus	-	Lisa	(Einsteins)
		Samantha	(Calculators)
		Charlene	(Brains)
		Martin	(Math Monsters)
		Sara	(Tigers)
		Charles	(Little Professors)
		Martha	(Little Professors)

Perfect Papers - John S., Sara, Martha, Eileen, Jim, and Derek

week. Most teachers prefer to prepare the newsletter over the weekend, and to distribute it first thing Monday morning. The newsletter contents are like those of the TGT newsletters; emphasize the weekly team scores as the most important feature. However, in a STAD newsletter you should also recognize students who earned bonus points for exceptional performance and students who got perfect papers. Always mention a student's team when you mention his name, and list the team members when you mention a team. This makes the team realize how important each member's score is to the team score. A sample STAD newsletter is presented in Figure 11. This newsletter contains the information taken from the quiz score sheet in Figure 10.

Weekly Schedule After the First Week

After the introductory week, STAD units may be used either once or twice each week. We recommend the following schedule:

Mon.	Tues.	Wed.	Thurs.	Fri.
Teach Lesson (or other activity)	Teach Lesson (or other activity)	Teach Lesson (or other activity)	Teach Lesson --- Team Practice	Team Practice --- **Quiz**

If you wish to teach two STAD units per week, you might use one on Monday and Tuesday, do something else on Wednesday, and use the second on Thursday and Friday.

Ending the Team Competition

As in TGT, the team competition in STAD should go on for no more than six to ten weeks before students should be assigned to new teams and the process begun again.

Combining TGT with STAD

It is easy to combine TGT and STAD. You may alternate between them (quiz one week, tournament the next), or use the tournament less frequently as a special activity. Students clearly prefer TGT to STAD because of the tournaments, but the tournaments take more time than the quizzes and take somewhat more organization. Particularly if you plan to use teams over a long period, you should vary your activities to keep the program fresh and interesting. Alternating STAD and TGT helps accomplish this goal.

When you use TGT and STAD together, you should keep your main records on a quiz score sheet. Just leave the score (%) blank when you have a tournament, but fill in the tournament score under "points." You will still need to use the tournament score sheet to keep the bumping straight.

Jigsaw II

Jigsaw is a technique developed by Elliot Aronson and his associates at the University of Texas and the University of California at Santa Cruz. It is a relatively simple technique, designed to increase students' sense of responsibility for their learning by making each one an "expert" on one part of an instructional unit, and then having each student teach the part on which he is an "expert" to the others on his team. Jigsaw II is based on Aronson's original Jigsaw concept, but has many different features. The original Jigsaw design is presented in a section following this one.

OVERVIEW

Jigsaw II can be used whenever the material to be studied is in narrative form. It is most appropriate in such subjects as social studies, literature, some parts of science, and related areas in which concepts rather than rote memory is the goal. The basic "raw material" for Jigsaw II should be a chapter, story, biography, or similar narrative or descriptive material.

In Jigsaw II, students work in heterogeneous teams as in TGT and STAD. The students are assigned chapters or other units to read, and are given "expert sheets" which contain different topics for each team member to focus on as he or she reads. When everyone has finished reading, students from different teams who had the same topics meet to discuss their topics in an "expert group" for about 30 minutes. The "experts" then return to their teams and take turns teaching their teammates about their topics. Finally, all of the team members take a quiz that covers all of the topics, and the quiz score becomes a team score as in STAD. Also as in STAD, bonus points are given to students who perform significantly better than others who are like them in past performance. Thus, students are motivated to study the material well and to work hard in their expert groups so that they can help their team do well. The key to Jigsaw is interdependence — every student depends on his or her teammates to provide the information necessary to do well on the quizzes.

PREPARING TO USE JIGSAW II

Materials

Before you begin, you need to make an "expert sheet" and a quiz for each section of material. At present, there are no Team Learning Project materials for Jigsaw, but preparing your own materials is not difficult.

To make your materials, follow these steps:

1. Find several chapters, stories, or other units that each cover the amount of material you would like to cover in a two- to three-day lesson. If you plan to have students read in class, the sections should not require more than a half hour to read; if you plan to assign the reading for homework, they can be longer.

2. Make an "expert sheet" for each unit. An expert sheet is a sheet of paper that tells students what they should concentrate on while they read, and tells them which expert group they will work with. It consists of four topics that are central to the chapter. For example, the first "expert sheet" for the Level Four Harcourt-Brace social studies book concerns a section on the Blackfoot indian tribes that is used to illustrate a number of concepts about groups, group norms, leadership, and so on. The "expert sheet" for that section is as follows:

Expert Sheet

"The Blackfoot"

To read: Pages 3-9 and 11-12.
Topics:

1. How were Blackfoot men expected to act?
2. What is a group and what does it do? What were the most important groups for the Blackfoot?
3. What did Blackfoot bands and clubs do?
4. What were the Blackfoot customs and traditions?

As much as possible, the topics should cover issues that appear throughout the chapter, instead of issues that appear only once. For example, if the class were reading *Tom Sawyer,* a good topic might be "How did Tom feel about his community?", which appears throughout the book, as opposed to "What happened to Tom and Huck Finn when they ran away?", which a student could learn by reading only a section of the book. Another expert sheet is shown in Appendix 4.

3. Make a quiz for each unit. The quiz should consist of eight questions, two for each topic. The questions should require considerable understanding, because the students will have had plenty of time to discuss their topics in depth, and easy questions would fail to challenge students who had done a good job in preparation. However, the questions should not be obscure. In the Blackfoot example, the first two questions were as follows:

1A: Which of the following was *not* an expected way of behaving for a Blackfoot man?
   A. He was expected to be brave
   B. He was expected to brag about how many of the enemy tribe he had touched
   C. He was expected to clean buffalo meat
   D. He was expected to share buffalo meat

1B: What are *norms of behavior?*
   A. All the ways of acting that people in a group have
   B. The ways people in a group expect themselves and other members of the group to act
   C. Records of great deeds
   D. Sharing food with the very old

All students must answer all questions, but the student who had the topic that the question is on gets double credit for that question. Thus, there are ten possible points on each quiz — two each for the two questions on the student's topic, and one each for the six other questions. The quiz should take no more than ten minutes. A complete sample quiz is presented in Appendix 4.

Assigning Students to Teams

Assign students to four- or five-member heterogeneous teams exactly as in TGT and STAD (see p. 11).

Assigning Students to Achievement Divisions

Rank students on past performance and assign them to achievement divisions exactly as for STAD (see p. 21). Use a quiz score sheet to record the initial division placement as well as all scores, bonus points, and changes in division assignment.

Schedules

Scheduling of Jigsaw II depends on whether or not you assign the reading as homework, how long it takes students to read the material in class if you don't assign it as homework, and how much time you wish to set aside for the Jigsaw units. The sequence of activities and approximate times required are presented below; you may shorten or lengthen the suggested times to fit your schedule and the time needed for your particular materials.

Sequence of Jigsaw activities:

1. Pass out expert sheets and assign topics (about 5 minutes).
2. Students read material (about 30 minutes).
3. Students meet in expert groups (about 20 minutes).
4. Students return to report to their teams (about 20 minutes).
5. Quiz (about 10 minutes).

Total time: 85 minutes

INTRODUCING JIGSAW II TO YOUR CLASS

Before you begin to use Jigsaw II in your class, you will need to have ready the following materials:

1. Student copies of the reading unit you plan to use (chapter, story, etc.).

2. An "expert sheet" for each student.
3. A quiz for each student.
4. Team summary sheets filled out with the names of the team members (team name blank).
5. A quiz score sheet filled out with students' names ranked by achievement division.

Suggested Schedule for Introducing Jigsaw II

Day 1	Day 2	Day 3
Introduce the idea of Jigsaw II and team assignment	Finish Reading	Team members return and report to team
Assign topics and begin reading	Expert Groups	**Quiz**

Step 1: Introduce Jigsaw II

You will need:

- Copies of your reading unit for each student.
- An "expert sheet" for each student.
- Team summary sheets filled out with the names of the team members (team name blank).

1. Introduce the Idea of Jigsaw II

To explain Jigsaw II to the students, you might say the following:

"For the next several weeks we are going to be using a new way of learning. It is called Jigsaw. In Jigsaw, you will work in learning teams to study reading material. Each of you will have a special topic to learn about. After you have read the material, you will discuss your topic with members of other teams, and then you will return to your team as an expert to teach your teammates about your topic. Finally, everyone will be quizzed on all of the topics. The topics are like the pieces of a puzzle — each expert will be working to fit his or her piece in so that the whole team can do well on the quiz. At the end of the week, you will receive a newsletter which will tell which teams have done the best on their quizzes."

2. Inform Students of Their Team Assignments

"Now I will tell you which team you will be on. When I read your name, find your teammates and sit next to them. Then choose a team name. Choose a good one, because you will use it for several weeks."

Read the names of the members of each team and point out a place for them to assemble. Students should move desks together to face each other or move to common tables. Record the names chosen by the teams on the team summary sheets.

3. Pass out Reading Material and Expert Sheets

When teammates have agreed upon a name and settled down, pass out the reading material and expert sheets to each student. Then continue as follows:

"As I mentioned before, the idea behind Jigsaw is that each student becomes an expert on a particular topic and then teaches it to his or her teammates. The first step in this process is to get a topic and then to read the material, looking in particular for information about that topic. In a moment, I will come around to assign you to topics. When I do, you may begin reading the pages indicated on your "expert sheets." Be sure to read carefully, so that you may learn about the material in general and your own topic in particular."

Go from team to team assigning students to topics. Make the assignments randomly; it is not important who gets which topics. As you assign topics, have the students start reading and let them read until the end of the period. Remind students to be sure to bring their expert sheets back for the next class period.

Step 2: Introducing Expert Groups

You will need:

- Your reading materials.

1. Finish Reading

Let the students finish their reading. Ask those who finish early to go back over the material to be sure they understand it.

2. Introduce Expert Groups

As soon as almost all students have finished reading, introduce expert groups as follows:

"Now you will all have a chance to discuss your topics with others who have the same topic. In a moment, I will ask everyone who has topic 1 to get together, everyone who has topic 2 to get together, and so on. In these expert groups you will be able to talk about your topic to decide what the most important things are about it. You should share your information so that others will share theirs. I will appoint a leader for each expert group just for today. The leader's job is to make sure that the expert group does its job well by trying to get every student in the expert group to help add ideas. Are there any questions?"

Point out a place for each expert group to assemble. If there are more than seven students in one group, break the group in two. Appoint a leader for each group. The leader does not have to be a good student. When the students are in their expert groups, have them start discussing their topics. Encourage them to try to anticipate what might be on the quiz, and recommend that they make lists of what they feel are important answers to the questions asked in the topics. Work with each expert group, one at a time, to help them structure their task and use the time effectively. You may wish to give the expert groups special hints so that they will have truly unique information to bring back to their teams.

Let the students work in their expert groups for the rest of the period.

Step 3: Team Reports and Quiz

You will need:

- Your reading materials.
- A copy of the quiz for each student.

1. Team Reports

Have students return to their teams and report on what they learned in their expert groups. Again the students should emphasize the main points and anticipate what might be on the quiz in preparing their teammates. If you wish, you may have a class discussion of the material following the team reports. If you do, try to draw on the "experts" in the discussion to emphasize their special skills and knowledge.

2. Quiz

Fifteen minutes before the end of the period, have students put away their materials and take the quiz.

After Day 3

Treat Jigsaw scores exactly as you would STAD scores, except that you may use the scores themselves without translating them to grades if you wish. Give bonus points to students who perform higher than usual (or higher than others in their divisions) exactly as for STAD, and then compute team scores and write the newsletter as for STAD.

Original Jigsaw

Aronson's original Jigsaw technique resembles Jigsaw II in most respects, but also has some important differences. In the original Jigsaw, students read individual sections that are entirely different from those read by their teammates. This has the benefit of making the "experts" possessors of completely unique information, and thus makes the teams value each team member's contribution that much more. For example, in a unit on Chile, one student might have a unit on Chile's economy, another on its geography, a third on its history, etc. To know all about Chile, a student has to rely on his teammates. Original Jigsaw also takes less time than Jigsaw II because the readings are shorter, being only a part of the total unit to be studied.

The most difficult part of original Jigsaw, and the reason that Jigsaw II is presented first in this manual, is that each of the individual sections must be written so that they are comprehensible by themselves. Existing materials cannot be used as in Jigsaw II; books can rarely be divided neatly into sections that make any sense without the other sections. For example, in a biography of Alexander Hamilton, the part that describes his duel with Aaron Burr would assume that the reader knew who both men were (having read the rest of the biography). Preparing an Original Jigsaw unit involves rewriting materials to fit the Jigsaw format. Jigsaw II has the added advantage of having all students read all of the material, which may make unified concepts easier to understand.

If you wish to use original Jigsaw to capitalize on its special features that give the "experts" unique information (which may contribute to Jigsaw's positive effects on students' self-esteem), use Jigsaw II with the following modifications:

1. Write units that present unique information about a subject but make sense by themselves. This can be done by cutting apart texts and adding information as needed, or by writing completely new material.
2. Original Jigsaw uses five- or six-member teams and five topics for each unit.
3. Original Jigsaw uses team leaders, and strongly emphasizes team building exercises before and during use of the technique. Team building involves activities that help the teams learn how to work together well and to get to know one another. Part of team building after the beginning is process analysis, in which team members are asked to analyze the strengths and weaknesses of their operation as a team. Of course, team building exercises may be used with any of the team techniques.
4. Original Jigsaw uses very few quizzes (if any), and does not use a team score, newsletter, or any other group contingency. Students simply receive individual grades.

For more information on Original Jigsaw, please see *The Jigsaw Classroom* by Elliot Aronson (Beverly Hills, California: Sage Publications, 1978).

Rutabaga

Rutabaga is a modification of TGT that is adapted to oral reading in the elementary grades. Students are assigned to teams as in TGT, but because the teams are heterogeneous, there will be students from different reading groups on each team. There is no teacher-oriented instruction in Rutabaga. During team practice time, students read to each other in pairs or triads, gaining facility and ease in oral reading. Then, on tournament day, students are assigned to three- to four-member tournament tables as in TGT. However, no students are assigned to tables outside of their own reading groups. A small piece of masking tape is placed on each table where all students can reach it equally well. The students open their books to the section they had practiced in their teams.

The first reader reads from the book. As he reads,

he leaves out a word of his choice and substitutes the word "rutabaga." At that point, the others at the table compete to put their hands on the tape (often called the "rutabaga"). The first to cover the tape with his hand fills in the missing word. If he is right, he receives one point; if he is wrong, he loses one point for guessing. The first reader may go for five "rutabagas," and then the student on his left becomes the reader. Because the reader cannot earn any points, it is important to make sure at the end of the period that each student has read an equal number of times. At the end of the period students tally their positive points and subtract their negative ones. The winner earns six points for his team, second place earns four points, etc., just as in TGT. Rutabaga is great fun, but it also gives students far more practice in oral reading than they could get in teacher-led reading groups. The structure is designed to motivate students to listen carefully to each other as well as to read frequently, and lets students read in a setting that is less threatening and more comfortable than the reading group. In combination with the usual reading group, Rutabaga may be an effective means of improving oral reading fluency.

The Full-Day Cooperative Model

Team techniques can be used in combination with each other until they occupy a substantial portion of the school day. In a recent study, fifteen teachers of grades 2 through 5 used TGT in all of their mathematics classes, STAD in their language arts classes, and Jigsaw II in their social studies classes. Some teachers also used Rutabaga in their reading groups. Students were in as many as three different teams, and most of their instructional day for a semester was taken up with team activities. A single newsletter was prepared in each school to announce the results of all of the team competitions. Teachers found the full-day model to be both workable and exciting. Many of them added team-related activities into their other subjects (such as science). The students also greatly enjoyed the process and seemed just as motivated and interested in the last week of the project as they were in the first.

This study indicated that it is possible to change the classroom experience for elementary students from a competitive structure to a cooperative one over major portions of the school day. The full-day cooperative model made school a positive social experience for students, but also focused them clearly on learning goals and activities. There is no reason that many team techniques cannot be used at the same time at any level, elementary or secondary, and there is some indication that using more than one technique enhances each by reinforcing the notion that cooperation is the dominant classroom mode.

Improvising — Basic Principles of Team Techniques

Once you have had some experience with team techniques, you may wish to improvise, to adapt team techniques to your own situation or needs. If you do, try to follow these basic principles:

1. Make sure you have some kind of recognition or reward for successful teams. The stronger the desire of team members to have their team be successful, the more likely it is that they will cooperate with and help one another to do well.

2. Try to make each student responsible for his or her own performance. That is, avoid team tasks in which there is a single "team product" that really could have been completed by one or two of the team members. We all remember being in "lab groups" that were supposed to prepare a single report — somehow, one student always wound up doing most of the work (and thus most of the learning). That is why the team scores in all of the student team learning techniques are composed of the sum of individual scores on individual quizzes or games — *all* students must do well if the team is to do well, and the team knows which students need help and which have done the most to help the team.

3. Try to set up the scoring system so that students of all achievement levels have an opportunity to contribute meaningfully to the team scores. This is the purpose of the tournament system in TGT and the bonus points in STAD. There are two reasons for this. First, it is important to set up a system of rewards in which a student is likely to be rewarded for increasing his level of performance over his usual level, so that all students are motivated to do their best. In traditional grading systems, some students are virtually guaranteed A's and B's, while others can hardly do so well no matter how hard they try. This results in decreased motivation for everyone. In a system that rewards *increases* in performance rather than ability, every student can succeed or fail based on his own efforts. Second, a system that rewards increases in performance is particularly important in a team technique, as it makes every team member's potential contribution large. This motivates team members to tutor the less able students, who might otherwise be ignored because they are perceived as unlikely to contribute much to the team score anyway.

If you do make modifications in team techniques or if you develop new ones, please send us a description. We are in a continual process of revising and improving team techniques, and your ideas will certainly help us.

Absences and Other Problems

ABSENCES

Absences are a problem in all team techniques both because the teams rely on their members' presence and because at the time team scores must be figured, it is usually impossible to know whether an absence was excused or unexcused. If most of the absences in your school are legitimate, when a student misses a tournament or a quiz simply prorate his team's score for that week. For example, if the absent student was on a four-member team, use Appendix 2 to prorate the team's score as for a three-member team.

If many or most of your absences are unexcused (skipping), give absent students a score of 2 for all techniques. However, in STAD or Jigsaw II, the student may make up the quiz within a day or two and receive the appropriate score, even though it won't count for his team score in the past week.

WITHDRAWALS AND NEW STUDENTS

If students withdraw from the class, try not to change team assignments as long as no team has fewer than three members. For new students, first try to assess their general level of academic performance. If they are high performers, place them on a team that needs help; if not, put them on a particularly successful team. Also, do not put them at the lowest table in TGT (or the lowest division in STAD) unless you know that they are low performers. If you have no idea about the new student's abilities, put them in the middle and be ready to change them as you see how they do.

PROBLEMS WITH TEAMS

Occasionally students assigned to the same team cannot get along. However, allowing students to change teams at will upsets the team balance. Make changes in team assignments only if there seems to be little possibility that students can work out their differences. Never let students decide which team they would like to be on, but make your own reassignments and stick with them. Being on a team may be hard for some students at first, but we have seen dozens of teams that looked hopeless at first finally pull together and work effectively. If a student absolutely refuses to work with his team, allow him to work separately but count his score in the team score. In most cases he'll eventually change his mind. An important part of your job in using a team technique is to set a tone of helpfulness, cooperation, and mutual support within teams, and to make it clear to your students that you value both good team relations and team successes.

CHANGING TEAMS

In all of the techniques, be sure to change teams and start the team competitions over again every six to ten weeks, both to keep the team competition from getting stale and to give members of losing teams a new chance.

WRITE US!

If you have problems or questions of any kind, however small, write us!

References

1. Slavin, R. E. Classroom Reward Structure: An Analytic and Practical Review. *Review of Educational Research,* 1977, *47*(4), 633-650.
2. DeVries, D. L. and Slavin, R. E. Teams-Games-Tournament: A Research Review. *Journal of Research and Development in Education,* in press.
3. Slavin, R. E. Student Teams and Achievement Divisions. *Journal of Research and Development in Education,* in press.
4. Lucker, G. W., Rosenfield, D., Sikes, J., and Aronson, E. Performance in the Interdependent Classroom: A Field Study. *American Educational Research Journal,* 1976, *13,* 115-123.
5. Slavin, R. E. Multiracial Student Team Instructional Programs and Race Relations in Desegregated Schools. Paper presented at the annual convention of the American Educational Research Association, Toronto, 1978.
6. Slavin, R. E. and DeVries, D. L. Learning in Teams. In Walberg, H. (ed.) *Educational Environments and Effects: Evaluation and Policy,* in press.

Appendices

APPENDIX 1. SCORE-TO-PERCENTAGE CONVERTER

Raw Score	Total Number of Quiz Items						
	8	25	30	35	40	45	50
1	13	4	3	3	3	2	2
2	25	8	7	6	5	4	4
3	38	12	10	9	8	7	6
4	50	16	13	11	10	9	8
5	63	20	17	14	13	11	10
6	75	24	20	17	15	13	12
7	88	28	23	20	18	16	14
8	100	32	27	23	20	18	16
9		36	30	26	23	20	18
10		40	33	29	25	22	20
11		44	37	31	28	24	22
12		48	40	34	30	27	24
13		52	43	37	33	29	26
14		56	47	40	35	31	28
15		60	50	43	38	33	30
16		64	53	46	40	36	32
17		68	57	49	43	38	34
18		72	60	51	45	40	36
19		76	63	54	48	42	38
20		80	67	57	50	44	40
21		84	70	60	53	47	42
22		88	73	63	55	49	44
23		92	77	66	58	51	46
24		96	80	69	60	53	48
25		100	83	71	63	56	50
26			87	74	65	58	52
27			90	77	68	60	54
28			93	80	70	62	56
29			97	83	73	64	58
30			100	86	75	67	60
31				89	78	69	62
32				91	80	71	64
33				94	83	73	66
34				97	85	76	68
35				100	88	78	70
36					90	80	72
37					93	82	74
38					95	84	76
39					98	87	78
40					100	89	80
41						91	82
42						93	84
43						96	86
44						98	88
45						100	90
46							92
47							94
48							96
49							98
50							100

APPENDIX 8. PRORATING SCORES FOR TEAMS WITH TWO, THREE, OR FIVE MEMBERS

Raw Scores	Five-Member Team	Three-Member Team	Two-Member Team
4			8
5			10
6		8	12
7		9	14
8		11	16
9		12	18
10	8	13	20
11	9	15	22
12	10	16	24
13	11	17	26
14	12	19	28
15	12	20	30
16	13	21	32
17	14	23	34
18	14	24	36
19	15	25	38
20	16	27	40
21	17	28	
22	18	29	
23	18	31	
24	19	32	
25	20	33	
26	21	35	
27	22	36	
28	22	37	
29	23	39	
30	24	40	
31	25		
32	26		
33	26		
34	27		
35	28		
36	29		
37	30		
38	30		
39	31		
40	32		
41	33		
42	35		
43	34		
44	35		
45	36		
46	37		
47	38		
48	38		
49	39		
50	40		

34

APPENDIX 3. INSTRUCTIONS FOR MAKING YOUR OWN WORKSHEETS, GAMES, AND QUIZZES (TGT AND STAD)

Making curriculum materials for TGT and STAD is very much like making worksheets and quizzes for any instructional unit. In fact, you may use worksheets and quizzes you have made before as TGT worksheets and games or as STAD worksheets and quizzes.

To make materials for TGT or STAD, follow these steps:

1. Make a game/quiz for each unit, and if you are using TGT, a game answer sheet. The game is used during the TGT tournaments; students play the games to add points to their team scores. If you use the same sheet as a quiz in STAD, it is taken by students to contribute to their team scores. Anything that has short questions and short answers can be made into a game/quiz, including questions at the backs of chapters, questions in workbooks or criterion-referenced tests, test items or items from test item banks, etc. The items need to be numbered. In the games, students will pick number cards and answer the question that corresponds to the number. Twelve decks of number cards are provided with this manual. If you find a set of questions you want to use that has a few items you want to exclude, simply have students remove the number cards corresponding to those questions from the deck. You should usually have 30-35 items unless the questions and answers are very short, so you will need to exclude items from longer sources. For quizzes, you may use somewhat fewer items — 20-25 is sufficient.

Anything that would make a good short-answer quiz would also make a good game. Game or quiz items should be neither too easy nor too hard, should concentrate on the main points instead of picky details, and should show understanding rather than memorization. Multiple choice should not be set up in a way that gives away the answer, for example by always having the correct answer be the longest, or by having impossibly wrong false answers (Example: "The system that produces hormones is a) the endocrine system; b) the sewer system"). Examples of good game/quiz and worksheet items are presented below.

You will need at least one copy of the game sheet, one answer sheet, and one set of number cards for every three students in your largest class, or one quiz for every student in STAD. Even if you have purchased materials, you may wish to make several games or quizzes and worksheets yourself, to fill in gaps in your usual curriculum left by the materials.

If you are using TGT, you will also need to make a *game answer sheet*, a list of answers to the game questions. Make one answer sheet for every three students in your class.

2. Make a *worksheet* and a *worksheet answer sheet* for each unit. The worksheets are used to help the teams prepare their members for the games (TGT) or quizzes (STAD). The worksheet can have any number of items, usually 30-40. The worksheet should be enough like the quiz so that studying it directly helps students do well on the quiz, but different enough so that students are unlikely to memorize the answers. The degree of overlap will vary depending on the unit. For example, the worksheet and game or quiz for a unit on irregular past tenses of verbs or multiplication tables might be the same because there are no rules to learn — memorizing is appropriate. On the other hand a unit on quotation marks or long division should have no overlap between the worksheet and the game or quiz, because for these skills there is a consistent rule that is applied, and memorizing is inappropriate. A unit on adding fractions might have a moderate overlap; it is appropriate to have students recognize that $\frac{1}{2} + \frac{1}{2} = 1$, but they also need to be able to apply the principle to a problem they have not seen before.

Make a *worksheet answer sheet* for each worksheet. This will be distributed with the worksheet so that students can check themselves and each other as they study the worksheets. It is important to let students have the answer sheets while they study so that they will focus on learning the content instead of just filling out the worksheet.

For TGT or STAD, make enough worksheets for every two students in your class. Again, this forces students to help one another study, and makes it difficult for them to treat the worksheet as a usual assignment to be completed and forgotten. For the same reason, do not let students write on the worksheets; besides it will make them reusable.

Two representative worksheets are reproduced below. Note that the mathematics worksheet and game/quiz have no overlap; the language arts worksheet and game/quiz has a 50% overlap (half of the items are the same, half different).

Parts of Speech (Adverbs) Game II.1.4.4
Worksheet

UNIT II: LANGUAGE MECHANICS

Objective: Use adverbs and adjectives in sentences correctly.
Instructions: This worksheet will help you prepare for the Parts of Speech (Adverbs) Game II.1.4.4. Decide whether you need an adjective or an adverb to complete the sentence correctly. Circle the correct choice.

Examples: The old man walked _____.

slow
(slowly)

The _____ dog wagged its tail.

(happy)
happily

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Worksheet II.1.4.4

He sat _____ through the trial. a) calm b) calmly 1	Drink the coffee _____. a) careful b) carefully 2	He denied the charge _____. a) angry b) angrily 3
The room was _____. a) noisy b) noisily 4	David seemed _____ with his grade. a) happy b) happily 5	Kathy was _____ when she lost her sweater. a) sad b) sadly 6
He did _____ on the test. a) bad b) badly 7	The family sat _____ while he explained the problems. a) quiet b) quietly 8	She picked up the egg _____. a) gentle b) gently 9
Mark cried _____ when his best friend moved away. a) bitter b) bitterly 10	The room was _____ lit. a) dim b) dimly 11	The rain fell _____ on the window pane. a) soft b) softly 12
Drive _____! a) safe b) safely 13	The _____ girl had no money for candy. a) poor b) poorly 14	Anne is _____ of her aunt. a) fond b) fondly 15
He swims _____. a) awkward b) awkwardly 16	Dan is a _____ runner. a) swift b) swiftly 17	Go up the stairs _____. a) slow b) slowly 18

Doesn't the little bush look _____ next to the big one?

a) strange

b) strangely

19

Do the task _____.

a) slow

b) slowly

20

The candy tasted _____.

a) sweet

b) sweetly

21

Dan runs _____.

a) swift

b) swiftly

22

David and Russ walked to school _____.

a) quick

b) quickly

23

The _____ children climbed into bed.

a) sleepy

b) sleepily

24

She looked at her report card _____.

a) sad

b) sadly

25

Robert was _____ to start.

a) eager

b) eagerly

26

Those flowers smell _____.

a) nice

b) nicely

27

He looked _____ about the news.

a) cheerful

b) cheerfully

28

The old woman laughed _____.

a) loud

b) loudly

29

The boy was doing very _____.

a) good

b) well

30

John chuckled _____.

a) delighted

b) delightedly

31

Come back _____.

a) quick

b) quickly

32

Worksheet Answer Sheet

II.1.4.4 - Adverbs

1. calmly
2. carefully
3. angrily
4. noisy
5. happy
6. sad
7. badly
8. quietly
9. gently
10. bitterly
11. dimly
12. softly
13. safely
14. poor
15. fond
16. awkwardly
17. swift
18. slowly
19. strange
20. slowly
21. sweet
22. swiftly
23. quickly
24. sleepy
25. sadly
26. eager
27. nice
28. cheerful
29. loudly
30. well
31. delightedly
32. quickly

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1 He sat _____ through the trial. a) calm b) calmly	11 The room was _____ lit. a) dim b) dimly	21 My friend looked _____. a) angry b) angrily
2 Drink the coffee _____. a) careful b) carefully	12 The rain fell _____ on the window pane. a) soft b) softly	22 The old man was very _____. a) glad b) gladly
3 He denied the charge _____. a) angry b) angrily	13 She looked at the young fawns _____. a) close b) closely	23 The fire burned _____. a) fierce b) fiercely
4 The room was _____. a) noisy b) noisily	14 They all grinned _____. a) shy b) shyly	24 We must measure this _____. a) exact b) exactly
5 She was _____ after the long run. a) breathless b) breathlessly	15 The gift was given _____. a) free b) freely	25 Robert was _____ to start. a) eager b) eagerly
6 The dog is _____ now. a) hungry b) hungrily	16 I have never been so _____ treated. a) cold b) coldly	26 Those flowers smell _____. a) nice b) nicely
7 The children behaved _____. a) polite b) politely	17 Dan is a _____ runner. a) swift b) swiftly	27 He looked _____ about the news. a) cheerful b) cheerfully
8 I will be with you _____. a) short b) shortly	18 Go up the stairs _____. a) slow b) slowly	28 The old woman laughed _____. a) loud b) loudly
9 She picked up the egg _____. a) gentle b) gently	19 Doesn't the little bush look _____ next to the big one? a) strange b) strangely	29 This job must be done _____. a) careful b) carefully
10 Mark cried _____ when his best friend moved away. a) bitter b) bitterly	20 Do the task _____. a) slow b) slowly	30 Tie the knot _____. a) loose b) loosely

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Game Answer Sheet

II.1.4.4 - Adverbs

1. calmly
2. carefully
3. angrily
4. noisy
5. breathless
6. hungry
7. politely
8. shortly
9. gently
10. bitterly
11. dimly
12. softly
13. closely
14. shyly
15. freely
16. coldly
17. swift
18. slowly
19. strange
20. slowly
21. angry
22. glad
23. fiercely
24. exactly
25. eager
26. nice
27. cheerful
28. loudly
29. carefully
30. loosely

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Worksheet: Rounding to nearest ten, hundred, or thousand

1. Round 62 to the nearest ten _____
2. Round 47 to the nearest ten _____
3. Round 11 to the nearest ten _____
4. Round 89 to the nearest ten _____
5. Round 99 to the nearest ten _____
6. Round 562 to the nearest hundred _____
7. Round 893 to the nearest hundred _____
8. Round 116 to the nearest hundred _____
9. Round 375 to the nearest hundred _____
10. Round 2,786 to the nearest hundred _____
11. Round 9,264 to the nearest hundred _____
12. Round 5,600 to the nearest thousand _____
13. Round 1,380 to the nearest thousand _____
14. Round 9,176 to the nearest thousand _____
15. Round 15,780 to the nearest thousand _____
16. Round 84 to the nearest ten _____
17. Round 68 to the nearest ten _____
18. Round 31 to the nearest ten _____
19. Round 12 to the nearest ten _____
20. Round 405 to the nearest hundred _____
21. Round 780 to the nearest hundred _____
22. Round 475 to the nearest hundred _____
23. Round 520 to the nearest hundred _____
24. Round 310 to the nearest hundred _____
25. Round 5,286 to the nearest hundred _____
26. Round 4.112 to the nearest thousand _____
27. Round 5,784 to the nearest thousand _____
28. Round 15,102 to the nearest thousand _____
29. Round 9,416 to the nearest thousand _____
30. Round 8,119 to the nearest thousand _____

Worksheet: Rounding to nearest ten, hundred, or thousand

Answer Sheet

1. 60
2. 50
3. 10
4. 90
5. 100
6. 600
7. 900
8. 100
9. 400
10. 2,800
11. 9,300
12. 6,000
13. 1,000
14. 9,000
15. 16,000
16. 80
17. 70
18. 30
19. 10
20. 400
21. 800
22. 500
23. 500
24. 300
25. 5,300
26. 4,000
27. 6,000
28. 15,000
29. 9,000
30. 8,000

Quiz/Game: Rounding to nearest ten, hundred, or thousand

1. Round 36 to the nearest ten _____
2. Round 84 to the nearest ten _____
3. Round 77 to the nearest ten _____
4. Round 41 to the nearest ten _____
5. Round 29 to the nearest ten _____
6. Round 388 to the nearest hundred _____
7. Round 721 to the nearest hundred _____
8. Round 849 to the nearest hundred _____
9. Round 201 to the nearest hundred _____
10. Round 897 to the nearest hundred _____
11. Round 765 to the nearest hundred _____
12. Round 1099 to the nearest thousand _____
13. Round 4679 to the nearest thousand _____
14. Round 5376 to the nearest thousand _____
15. Round 2837 to the nearest thousand _____
16. Round 69 to the nearest ten _____
17. Round 11 to the nearest ten _____
18. Round 26 to the nearest ten _____
19. Round 76 to the nearest ten _____
20. Round 561 to the nearest hundred _____
21. Round 251 to the nearest hundred _____
22. Round 341 to the nearest hundred _____
23. Round 987 to the nearest hundred _____
24. Round 238 to the nearest hundred _____
25. Round 499 to the nearest hundred _____
26. Round 4099 to the nearest thousand _____
27. Round 1568 to the nearest thousand _____
28. Round 2701 to the nearest thousand _____
29. Round 2820 to the nearest thousand _____
30. Round 6834 to the nearest thousand _____

Quiz/Game: Rounding to nearest ten, hundred, or thousand

Answer Sheet

1. 40
2. 80
3. 80
4. 40
5. 30
6. 400
7. 700
8. 800
9. 200
10. 900
11. 800
12. 1000
13. 5000
14. 5000
15. 3000
16. 70
17. 10
18. 30
19. 80
20. 600
21. 300
22. 300
23. 1000
24. 200
25. 500
26. 4000
27. 2000
28. 3000
29. 3000
30. 7000

APPENDIX 4. SAMPLE JIGSAW II UNIT

This appendix contains a complete Jigsaw II Unit. It is based on the introduction of this manual for the sake of illustration. Before you use Jigsaw II you might use this unit with other teachers to get a students'-eye view of the technique.

The expert sheet appears below. If you are simulating Jigsaw, assign yourself to a team, pick one of the four topics and then re-read the introduction. Then discuss the topic with your "expert group," return to your team to report on your topic, and take the quiz. The quiz answers are as follows: *c b a b a c d d.*

Expert Sheet

To read: The Introduction to this manual

Topics:

1. What are the principal features of TGT, STAD, and Jigsaw?
2. What has the research on Student Team Learning found?
3. Why do the student team learning techniques produce the effects that they do?
4. What are some of the reasons that teachers might adopt one of the student team learning techniques?

Quiz: Student Team Learning

1a. What is the main difference between TGT and STAD?
   a) TGT is less expensive to use than STAD.
   b) STAD is used mostly in social studies, TGT in mathematics and language arts.
   c) TGT uses instructional games, STAD uses quizzes.
   d) TGT uses practice worksheets, STAD does not.

1b. What do TGT and Jigsaw have in common?
   a) Expert groups
   b) Heterogeneous teams
   c) Quizzes
   d) Instructional games

2a. Which of the student team learning techniques has been evaluated in the largest number of studies?
   a) TGT
   b) STAD
   c) Jigsaw
   d) University of Minnesota techniques

2b. Which of the following is the most consistent finding for all team learning techniques?
   a) Improved basic skills learning
   b) Improved race relations
   c) Increased self-esteem
   d) Increased satisfaction

3a. Which of the following is a reason mentioned in the Introduction for effects of team techniques on learning?
   a) Peer support for academic performance
   b) Effectiveness of peer tutoring
   c) Increased mutual concern
   d) Improved student attitudes

3b. Which is *not* a reason implied in the Introduction for the effects of student team learning on positive race relations?
   a) Students in multiracial teams must interact.
   b) Teams in general increase mutual concern among teammates.
   c) Students in multiracial teams learn about each other cultures.
   d) Students in multiracial teams learn to help one another.

4a. Which is *not* a reason that a teacher might adopt student team learning techniques?
   a) Team techniques allow the teacher to be a facilitator rather than a director.
   b) Team techniques improve student learning, positive race relations, and other dimensions.
   c) Team techniques provide an effective class management system.
   d) Team techniques take less time than traditional techniques.

4b. Which traditional classroom activity do TGT and STAD replace most effectively?
   a) Teacher lectures
   b) Supplementary activities
   c) Homework
   d) Drill

APPENDIX 5. SAMPLE GAME SCORE SHEETS

TABLE NO. _____ GAME SCORE SHEET

PLAYER	TEAM	Game 1	Game 2	Game 3	DAY'S TOTAL	TOURNAMENT POINTS

TABLE NO. _____ GAME SCORE SHEET

PLAYER	TEAM	Game 1	Game 2	Game 3	DAY'S TOTAL	TOURNAMENT POINTS

TABLE NO. _____ GAME SCORE SHEET

PLAYER	TEAM	Game 1	Game 2	Game 3	DAY'S TOTAL	TOURNAMENT POINTS

TABLE NO. _____ GAME SCORE SHEET

PLAYER	TEAM	Game 1	Game 2	Game 3	DAY'S TOTAL	TOURNAMENT POINTS

APPENDIX 6. TOURNAMENT SCORE SHEET (TGT)

Tournament Number:

Student	Team	1	2	3	4	5	6	7	8	9	10	11	12	13

TEAM SUMMARY SHEET

Team Name _____

Team Members	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Total Team Score														
Transformed Team Score														
Team Standing This Week														
Cumulative Score														
Cumulative Standing														

APPENDIX 8. QUIZ SCORE SHEET (STAD AND JIGSAW II)

		QUIZ #				QUIZ #			
Student	Team	Div.	Score (%)	Points	Bonus Points	Div.	Score (%)	Points	Bonus Points